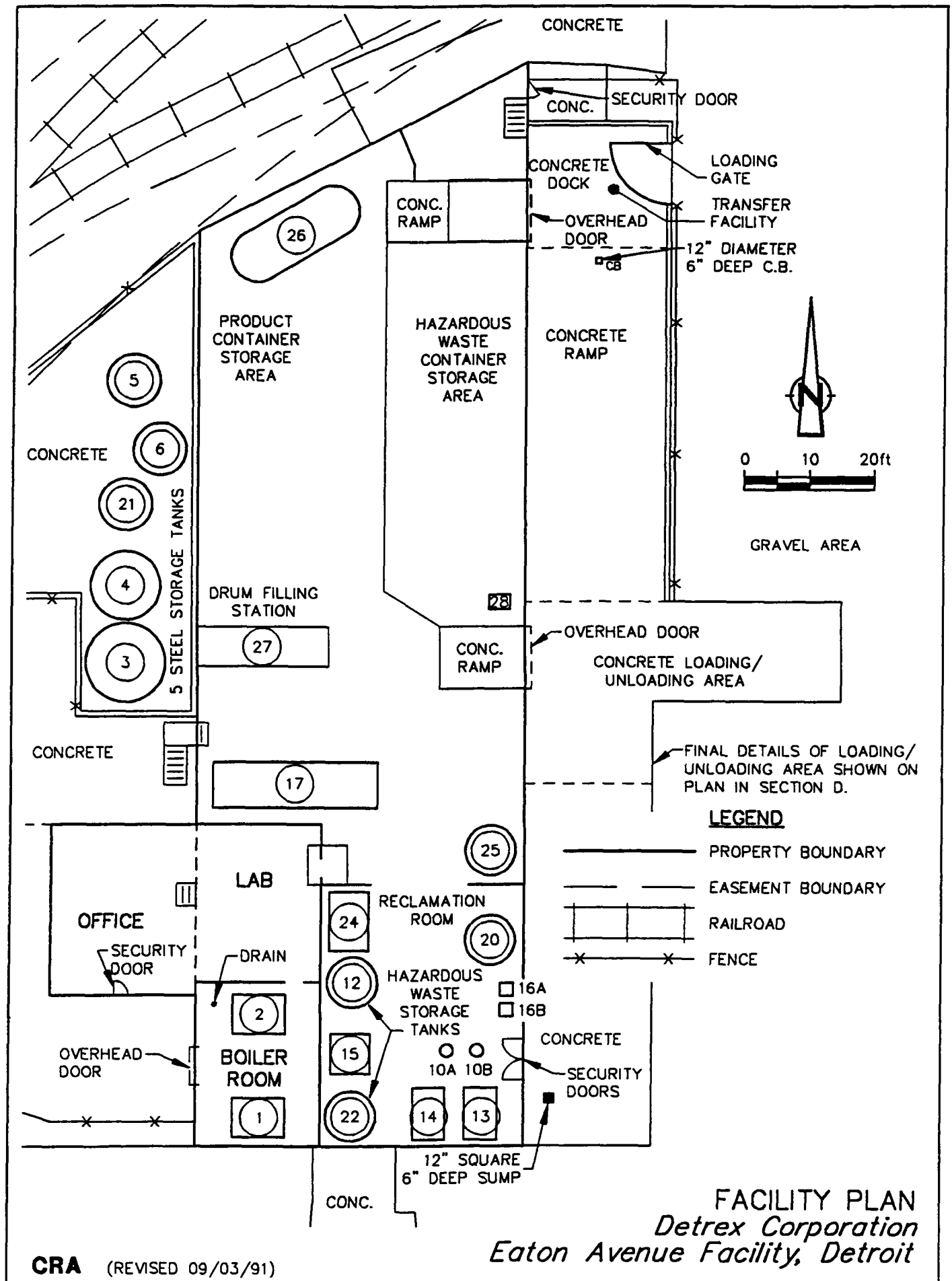


US EPA RECORDS CENTER REGION 5



1004852

ATTACHMENTS



Date: 09/03/91
Revision: 91-2

LIST OF PROCESS EQUIPMENT

<i>I.D. No.</i>	<i>Equipment Name</i>	<i>Description</i>
1.	Generator	Clayton Model E-100 Steam Generator. Unit burns natural gas to produce steam at the rate of 3450 lbs./hr. at 100 psig.
2.	Air Compressor	
3.	20,000 gal. Product Tank	20,000 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
4.	10,000 gal. Product Tank	10,000 gallon carbon steel storage tank for storage of Trichloroethylene
5.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Perchloroethylene.
6.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Trichloroethylene
10 A/B	2 - 600 gal. Receiver Tanks	Used for receiving product from Detrex stills. (Operated at atm. pressure).
12.	2,300 gal. Hazardous Waste tank storage tank	2,300 gallon carbon steel storage tank used for storage of F001 or F002 material prior to processing
13.	350 gal. Detrex Still	Detrex Model S-350. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
14.	350 gal. Detrex Still	Detrex Model S-600. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
15.	DCI Still	DCI Model Dyna-1-100 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 100 gallons per hour.
16 A/B	Drying Columns	Detrex Dual Column Drier. Used to remove water from recovered product (solvent) via adsorption.

Item	Quantity	Unit	Value
1. 1000 g of 100 mesh sieve material	1000 g	kg	1000
2. 1000 g of 200 mesh sieve material	1000 g	kg	1000
3. 1000 g of 400 mesh sieve material	1000 g	kg	1000
4. 1000 g of 600 mesh sieve material	1000 g	kg	1000
5. 1000 g of 800 mesh sieve material	1000 g	kg	1000
6. 1000 g of 1000 mesh sieve material	1000 g	kg	1000
7. 1000 g of 1200 mesh sieve material	1000 g	kg	1000
8. 1000 g of 1400 mesh sieve material	1000 g	kg	1000
9. 1000 g of 1600 mesh sieve material	1000 g	kg	1000
10. 1000 g of 1800 mesh sieve material	1000 g	kg	1000
11. 1000 g of 2000 mesh sieve material	1000 g	kg	1000
12. 1000 g of 2200 mesh sieve material	1000 g	kg	1000
13. 1000 g of 2400 mesh sieve material	1000 g	kg	1000
14. 1000 g of 2600 mesh sieve material	1000 g	kg	1000
15. 1000 g of 2800 mesh sieve material	1000 g	kg	1000
16. 1000 g of 3000 mesh sieve material	1000 g	kg	1000
17. 1000 g of 3200 mesh sieve material	1000 g	kg	1000
18. 1000 g of 3400 mesh sieve material	1000 g	kg	1000
19. 1000 g of 3600 mesh sieve material	1000 g	kg	1000
20. 1000 g of 3800 mesh sieve material	1000 g	kg	1000
21. 1000 g of 4000 mesh sieve material	1000 g	kg	1000
22. 1000 g of 4200 mesh sieve material	1000 g	kg	1000
23. 1000 g of 4400 mesh sieve material	1000 g	kg	1000
24. 1000 g of 4600 mesh sieve material	1000 g	kg	1000
25. 1000 g of 4800 mesh sieve material	1000 g	kg	1000
26. 1000 g of 5000 mesh sieve material	1000 g	kg	1000
27. 1000 g of 5200 mesh sieve material	1000 g	kg	1000
28. 1000 g of 5400 mesh sieve material	1000 g	kg	1000
29. 1000 g of 5600 mesh sieve material	1000 g	kg	1000
30. 1000 g of 5800 mesh sieve material	1000 g	kg	1000
31. 1000 g of 6000 mesh sieve material	1000 g	kg	1000
32. 1000 g of 6200 mesh sieve material	1000 g	kg	1000
33. 1000 g of 6400 mesh sieve material	1000 g	kg	1000
34. 1000 g of 6600 mesh sieve material	1000 g	kg	1000
35. 1000 g of 6800 mesh sieve material	1000 g	kg	1000
36. 1000 g of 7000 mesh sieve material	1000 g	kg	1000
37. 1000 g of 7200 mesh sieve material	1000 g	kg	1000
38. 1000 g of 7400 mesh sieve material	1000 g	kg	1000
39. 1000 g of 7600 mesh sieve material	1000 g	kg	1000
40. 1000 g of 7800 mesh sieve material	1000 g	kg	1000
41. 1000 g of 8000 mesh sieve material	1000 g	kg	1000
42. 1000 g of 8200 mesh sieve material	1000 g	kg	1000
43. 1000 g of 8400 mesh sieve material	1000 g	kg	1000
44. 1000 g of 8600 mesh sieve material	1000 g	kg	1000
45. 1000 g of 8800 mesh sieve material	1000 g	kg	1000
46. 1000 g of 9000 mesh sieve material	1000 g	kg	1000
47. 1000 g of 9200 mesh sieve material	1000 g	kg	1000
48. 1000 g of 9400 mesh sieve material	1000 g	kg	1000
49. 1000 g of 9600 mesh sieve material	1000 g	kg	1000
50. 1000 g of 9800 mesh sieve material	1000 g	kg	1000
51. 1000 g of 10000 mesh sieve material	1000 g	kg	1000

Date: 09/03/91
Revision: 91-2

LIST OF PROCESS EQUIPMENT

<i>I.D. No.</i>	<i>Equipment Name</i>	<i>Description</i>
17.	5,000 gal. Still Bottom Tank	5,000 gallon carbon steel storage tank. Used for temporary accumulation of still bottoms from recovery of chlorinated solvents (F002 material).
20.	2,500 gal. Holding Tank	2,500 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
21.	4,500 gal. 1,1,1 Trichloroethane	4,500 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
22.	4,500 gal. Hazardous Waste Storage Tank	4,500 gallon carbon steel storage tank used for temporary storage of F001 or F002 material prior to being processed by Detrex stills.
24.	DCI Still	DCI Model Dyna-1-500 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 500 gallons per hour.
25.	3,000 gal. Holding Tank	3,000 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
26.	SVRM - Carbon Absorption Unit	
27.	Drum Filling Station	Product Drumming Station. Used for filling 55-gallon drums with product. Unit can fill approximately 30 drums per hour and is operated as necessary.
28.	Product Blending Vessel	550 gallon carbon steel vessel utilized for product blending.

ATTACHMENT D-2

ENGINEERING DRAWINGS

CERTIFICATION

I certify under penalty of law that, based upon my review of the below listed documents, that the information provided, and design is accurate as drawn and installed in the same manner.

I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Documents:

Hamilton Welding Tank Prints No. 's: HW8518C
HW84206C

Warner, Cantrell Survey Drawing: N.B. 614

Detrex Corporation "New Gold Shield
Reclamation Addition" (1966) E-65-6-100

Certified by:

Signature:

Name:

I. H. Shahiyeh

Company:

Detrex Corporation

Professional Engineer

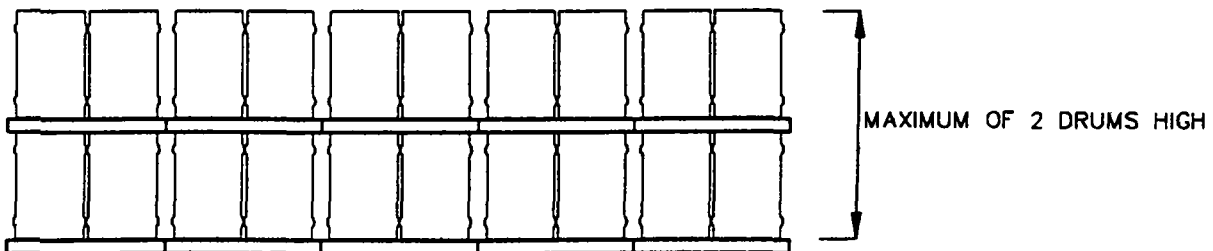
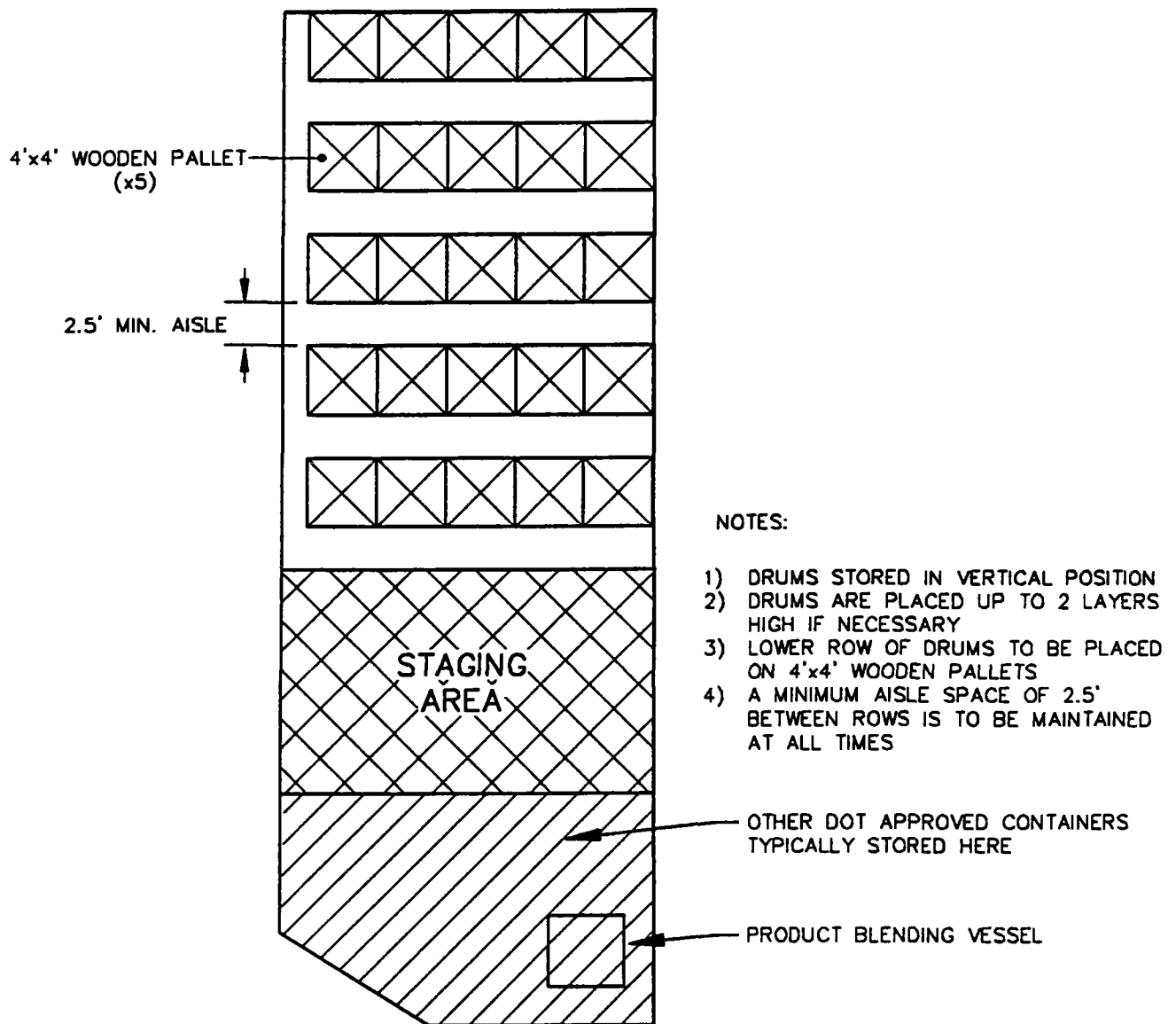
Registration No. 222

State: California

Date: 2-22-71

ATTACHMENT D-3

TYPICAL CONTAINER ARRANGEMENT



TYPICAL DRUM STACK PROFILE
(1"=5')

TYPICAL CONTAINER ARRANGEMENT
Detrex Corporation
Eaton Avenue Facility, Detroit

ATTACHMENT D-4

SECONDARY CONTAINMENT VOLUME

**Calculation of the
Volume of Containment
inside the Eaton Ave. Facility**

The smallest height of curb was used in the calculations.
This is 0.60 foot. The total area of storage and TSD
distillation =

$$\text{Area (1) + Area (2) + Area (3) = Area (4) + Area (5) +} \\ \text{Area (6) + Area (7) + Area (8)}$$

Area (1) = 15' x 30'		= 450 ft. ²
Area (2) = 2.5' x 15'		= 37.50 ft. ²
Area (3) = 50' x 59'		= 2950.00 ft. ²
Area (4) = 10' x 37.5'		= 375.00 ft. ²
Area (5) = 20' x 50'		= 1000.00 ft. ²
Area (6) = 3.75' x 32.5'		= 121.88 ft. ²
Area (7) = 6.25' x 27.5'		= 171.88 ft. ²
Area (8) = 40' x 31.25'		= 1250.00 ft. ²

TOTAL Area		6356.00 ft. ²

$$\text{Volume in gallons} = 6356.00 \text{ ft.}^2 \times 0.06' = 3813.6 \text{ Cu.} \\ \text{ft.}^2 \times 7.48 = 28,525 \text{ Gallons.}$$

LESS

$$\text{Area (9) = 20' x 32' x 0.60' = 384 ft}^3$$

$$384 \times 7.48 \frac{\text{Gal}}{\text{ft}^3} = 2872 \text{ Gallons}$$

and

Tank pads: There are 2 tank pads which are 6' Dia. x 8" and 8' Dia. x 8"

$$\text{Area of Pads} = \frac{\text{Pi (6)}^2}{4} + \frac{8^2}{4} = 25 \text{ Pi} = 25 (3.1416) =$$

$$78.5 \text{ ft}^2$$

$$\text{Volume } 78.5 \text{ ft}^2 \times .60' = 47.1 \text{ ft}^3$$

$$\text{Gallons} = 47.1 \times 7.48 = (352) \text{ Gallons}$$

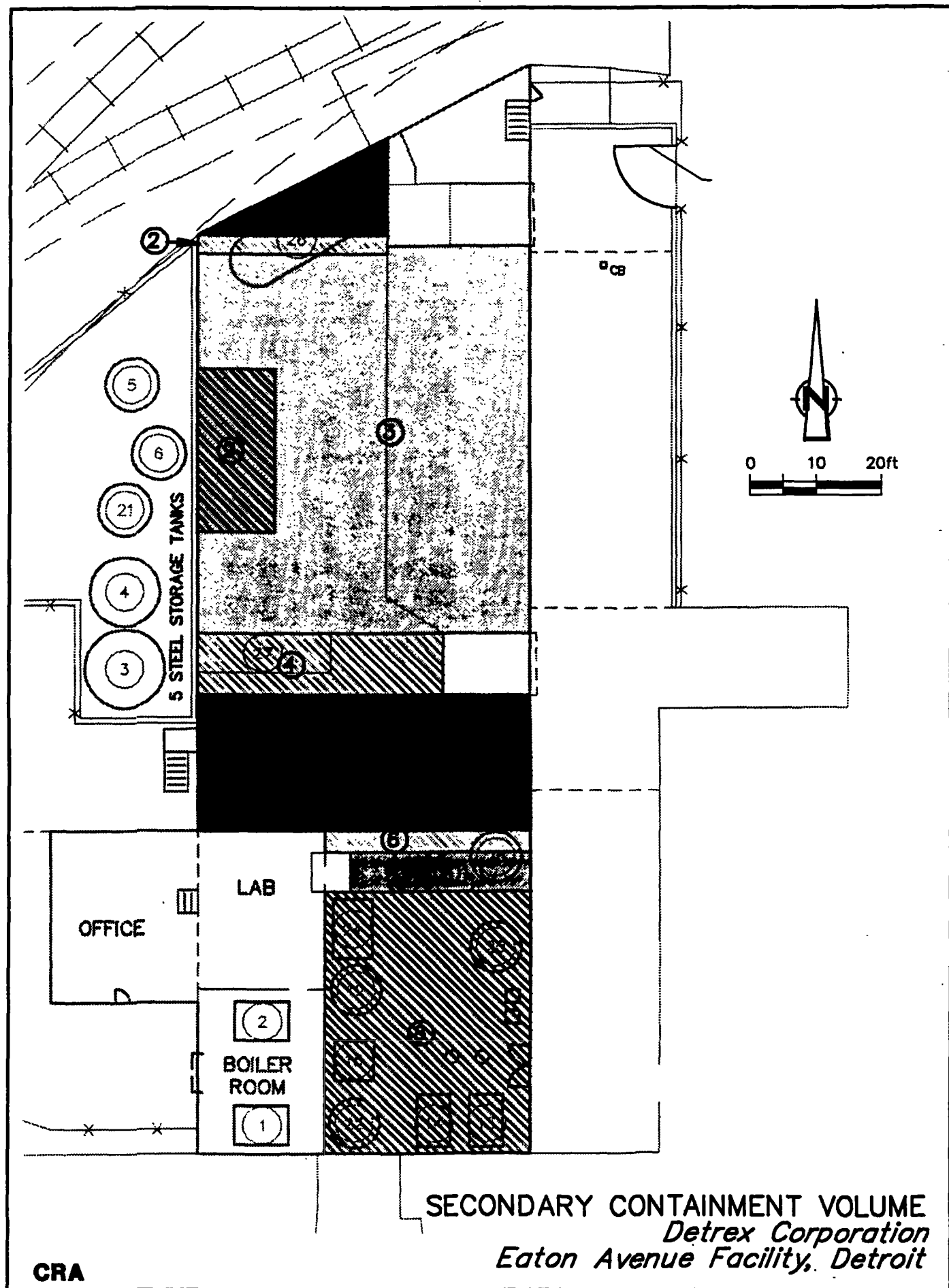
Net Containment Area =	28,525 Gallons
	- 2,872 Gallons
	- 352 Gallons

	25,301 Gallons
	=====

The above calculations were complete and certified
by the below signed on June 21, 1991.

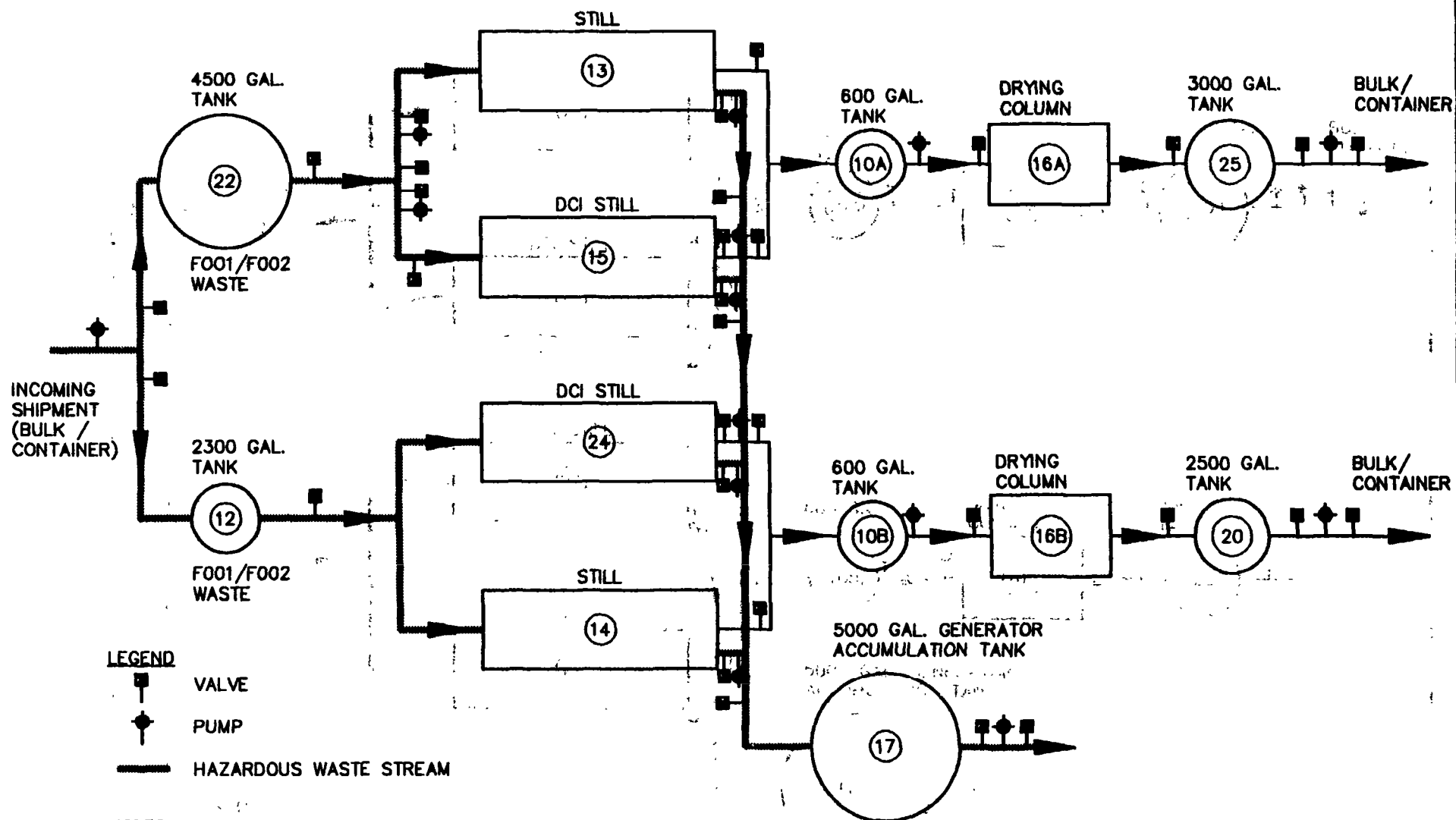
Joe H. Shantz

Engineer No. 11222



ATTACHMENT D-5

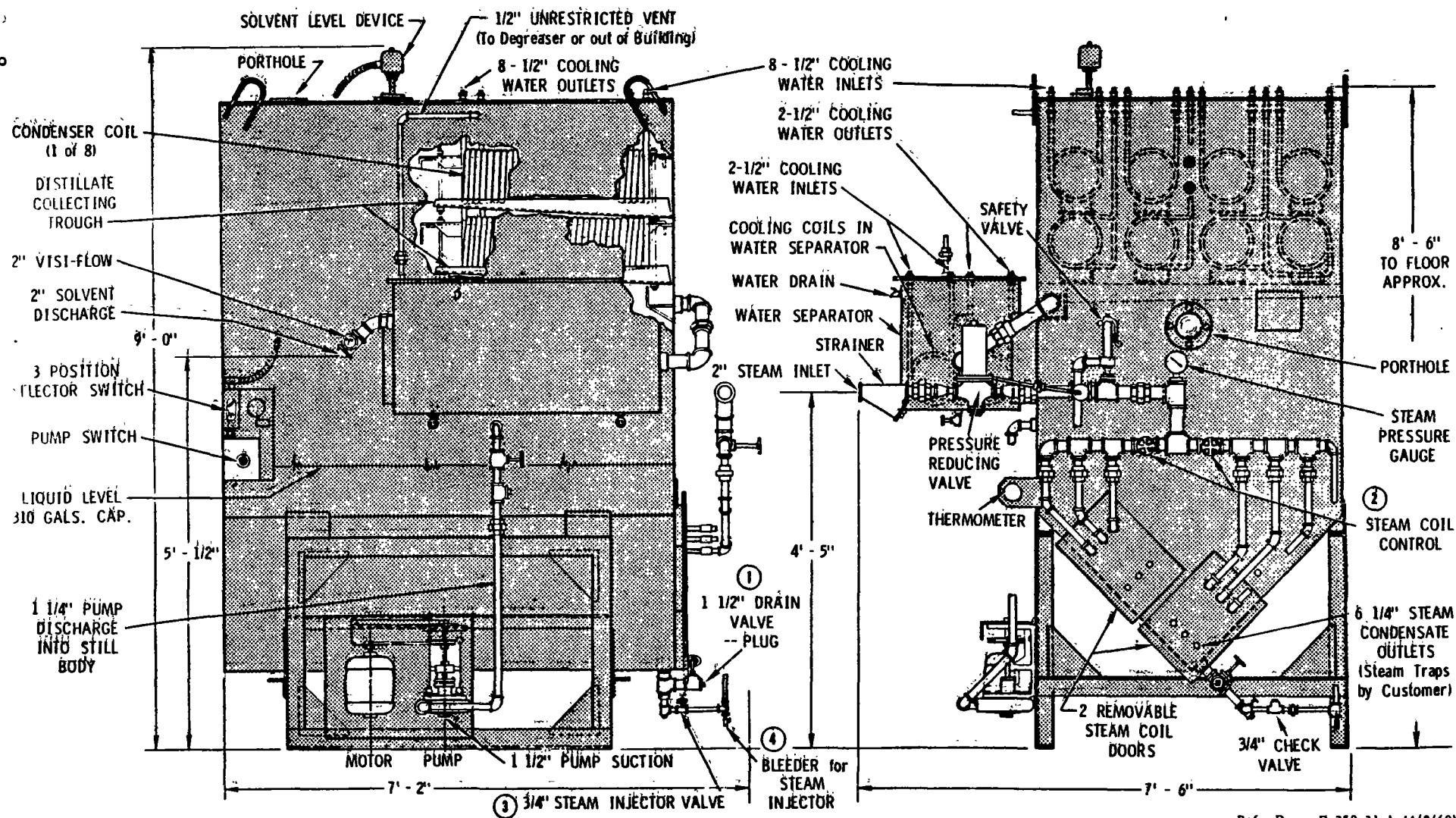
PROCESS FLOW DIAGRAM



PROCESS FLOW DIAGRAM
Detrex Corporation
Eaton Avenue Facility, Detroit

CRA

(REVISED 09/03/91)



Ref. Dwg. D-250.31-1 (4/8/60)

MODEL S 600 STILL -- SERVICE DRAWING

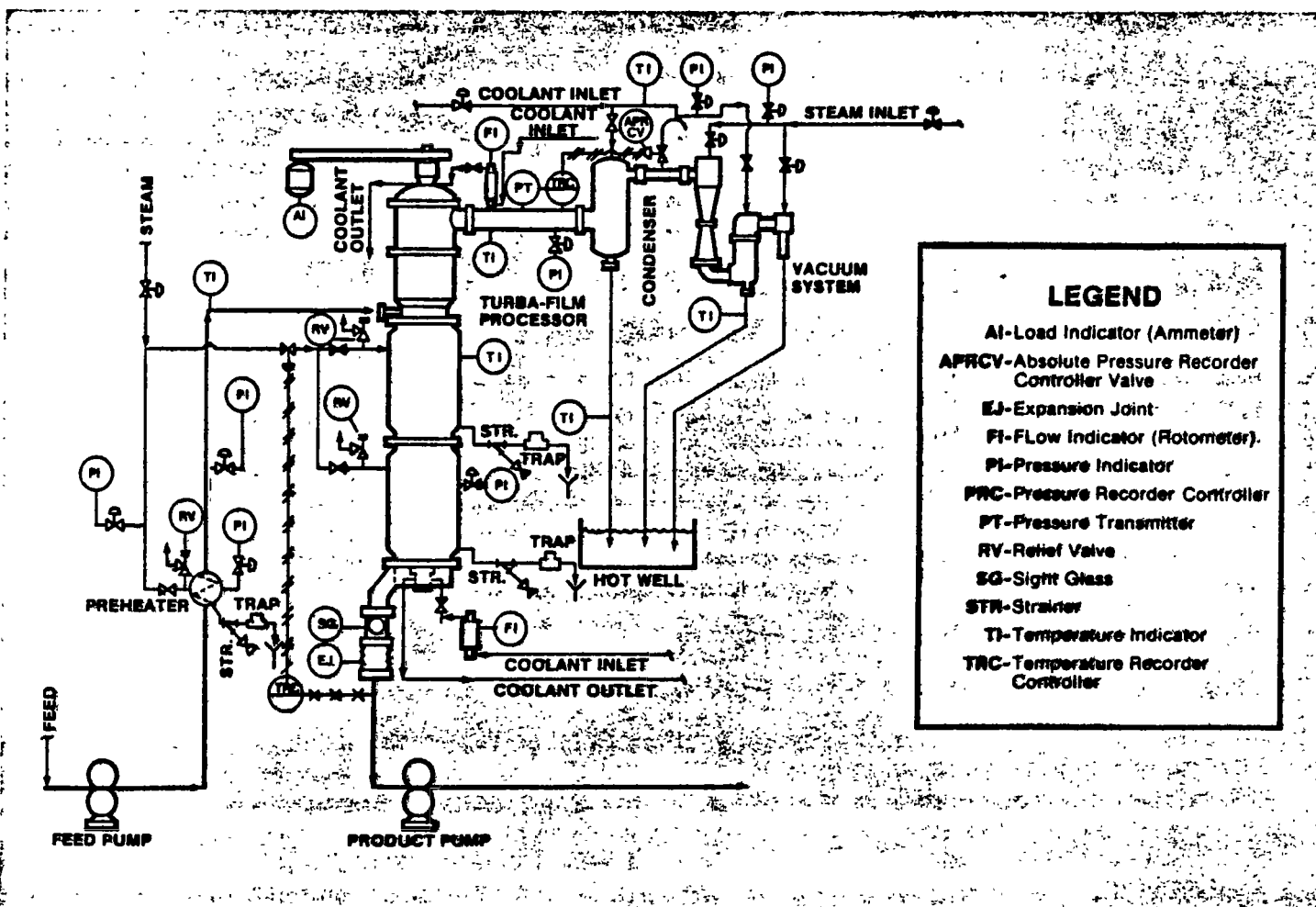
Systems Engineering /

Chemetron offers you knowledge, experience, and services of its engineering organization in the preparation of purchase specifications for all components in the design of your Turba-Film Processor system, including instrumentation, controls, pumps and other auxiliary equipment.

Chemetron can also supply all components of a complete process system around the Turba-Film Processor. Included are all pumps, heat exchangers, vacuum equipment, controls and other auxiliaries

including complete skid mounted assemblies, prepped, wired, etc. . . . ready for operation as shown on the opposite page.

The flow diagram below illustrates in general the auxiliaries and controls that might be furnished to make up a complete system. Plant needs and process requirements determine what actual controls and auxiliaries are required to insure proper operation and performance of the Turba-Film Processor.



PUMPS To obtain a constant feed flow rate, a positive displacement type pump with variable speed drive is generally recommended. The product discharge pump is also usually of this type. The selection of either is based upon product characteristics and service requirements.

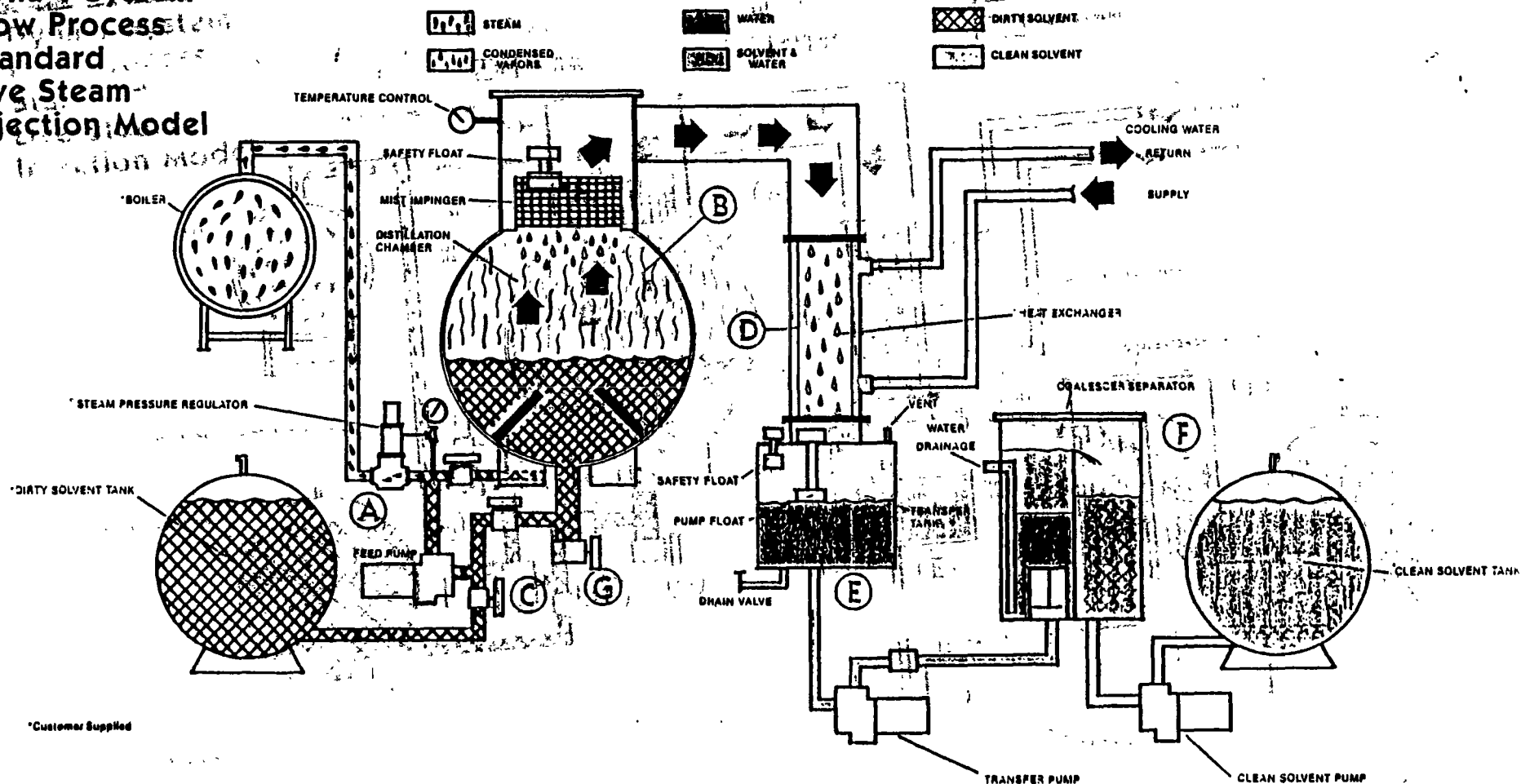
CONDENSERS When condensing water vapor, a direct cooling barometric condenser may be used. For recovery of vapor as process water or for the condensation of non-condensable vapors, a surface condenser is provided.

VACUUM SYSTEMS For removal of non-condensable gases and maintaining of vacuum, single or multiple stage steam jet ejectors can be furnished. Alternately, positive

displacement vacuum pumps can be provided depending upon required vacuum, vapor characteristics and plant economics.

INSTRUMENTATION Control of absolute pressure within the Processor and steam jacket temperature are basic to good Turba-Film performance. Additional instrumentation may be included to regulate product concentration, liquid level in the outlet pipe, and "fail safe" devices for steam and feed cutoff. An enclosed panel board can be provided to incorporate all control instrumentation, dial gauges, flow indicators and push-button stations.

Dyna 1 System **Flow Process** **Standard** **Live Steam** **Injection Model**



A. The DYNA 1 cycle begins as the distillation chamber is filled with contaminated solvent accompanied by the simultaneous and direct injection of low pressure live steam.

B. The azeotropic boiling point of the water/solvent mixture is lower than the atmospheric boiling point of either solvent or water individually. Hence, vaporization of the solvent occurs almost immediately.

C. The solvent batch is recirculated through the suction side of the feed/recirculation pump to increase BTU transfer and to suspend particulate matter.

D. The distillate vapors are condensed through a water-cooled heat exchanger.

E. The condensed solvent and water mixture is collected in a transfer tank and then pumped to the coalescer separator.

F. The solvent and water are separated by being pumped through the fiberglass coalescer separator. The distilled water is drained and the distilled solvent is pumped to the customer's desired location.

G. When all the solvent has been distilled from the distillation chamber, the temperature will quickly rise to 212°F, or a pre-set temperature signaling drainage of the solvent-free residue.

ATTACHMENT D-6

TANK DRAWINGS AND ASSESSMENT

Detrex

CORPORATION



February 11, 1991

Mr. Donald Mbamah
Michigan Department of Natural Resources
Southeast Michigan District Headquarters
38980 Seven Mile Road
Livonia, MI 48152

Dear Mr. Mbamah:

As required by Act 64, Detrex Corporation has conducted the annual assessment of hazardous waste tanks at its TSDF located at 12886 Eaton Ave, Detroit, MI. Through comparative analysis of the original data, 1991 data received via Ultrasonic Thickness Measurement and the structural integrity calculations originally performed on the tanks, it is my opinion that the three (3) carbon steel storage tanks are structurally sound for their intended use.

I have attached a copy of the documentation of assessment procedures for your benefit.

If you have any questions regarding the procedures, data, or methodology, please feel free to contact me at your convenience.

Sincerely,

DETREX CORPORATION

Ronald E. Swan, Jr.
Manager of Engineering

RS:jg:

enclosure(s)

cc: R. Hritzkowin - Detrex
R.J. Jones - Detrex
W. Moore - Detrex
I.H. Shamiyeh - Detrex
M.J. Repatti - Detrex

Introduction

Detrex Corporation currently utilizes three tanks for management of hazardous waste at it's Eaton Avenue Plant. The State of Michigan Department of Natural Resources requires tanks used in this manner be certified for the intended use by an independant professional Engineer. The tank's condition must then be assessed annually thereafter.

In January, 1990, the aforementioned tanks were cleaned and inspected. Thickness measurements were then taken and structural integrity calulations performed. Based on these data, Randers Engineering, Inc. certified the tanks as adequate for their inteded use.

Scope

Based on the requirements for annual assessment, Detrex Corporatoin Solvents and Environmental Services Division, Engineering Department will conduct the following:

1. Visually inspect the tank to determine integrity and compare with 1990 data.
2. Conduct Ultrasonic thickness measurement of the tank shell and heads.
3. Compare data recorded via thickness measurement with data recorded in 1990.
4. Utilize data recorded to determine current integrity of tanks via analytical and engineering methods utilized in the origional certification proceedure.

Conclusions

A. 2,300 Gallon Vertical Tank

The bottom head and shell up to 3' demonstrate minimal thinning due to corrosion. The surface is uniformly coated with blush rust. From 3' to the top head, the surface exhibits increasing corrosion and minimal sealing. A minimal amount of pitting was observed. The average shell and head thickness exceeds the minimum thickness requirement including a corrosion allowance of 1/16".

B. 4,000 Gallon Vertical Tank

The tank was not accessable to visual inspection of the

internal surfaces of the tank. Measurements were taken from the exterior of the tank as was the case in the original certification. The average shell thickness exceeds the minimum requirement including a corrosion allowance of 1/16".

C. 5,000 Gallon Horizontal Tank

The average shell and head thickness exceeds the minimum thickness requirement including a corrosion allowance of 1/16".

Based on the fact that both vertical tanks are utilized for the same service, it is most likely that the interior of both tanks would appear to be similar. Since the heads of the 2,300 gallon tank exceed minimum standards by well over 150%, it is not imperative to remove the 4,000 gallon tank from service immediately. However, before a conclusion can be drawn on this tank, the interior must be inspected and the bottom head thickness ascertained.

In consideration of the other data obtained, it is the author's opinion that the structural integrity of the 2,300 and 5,000 gallon tanks is sound. Should the impending visual inspection and thickness measurements of the 4,000 gallon tank remain consistent with trends noted here, a favorable statement (with supporting documentation) will be forwarded.

Attachment Number 1
Tank Assessment Data Summary

4,000 Gallon F001 Tank

Corrosion Allowance	0.062 in.
Shell thickness minimum requirement	<u>0.079 in.</u>
Shell thickness total requirement	0.141 in.
Avg. shell thickness, actual measurement	0.216 in.
Head thickness minimum requirement	<u>0.074 in.</u>
Head thickness total requirement	0.136 in.
Avg. head thickness, actual measurement	unknown

2,300 Gallon F001 Tank

Corrosion Allowance	0.062 in.
Shell thickness minimum requirement	<u>0.079 in.</u>
Shell thickness total requirement	0.141 in.
Avg. shell thickness, actual measurement	0.238 in.
Head thickness minimum requirement	<u>0.074 in.</u>
Head thickness total requirement	0.136 in.
Avg. head thickness, actual measurement	0.265 in.

5,000 Gallon F002 Tank

Corrosion Allowance	0.062 in.
Shell thickness minimum requirement	<u>0.073 in.</u>
Shell thickness total requirement	0.135 in.
Avg. shell thickness, actual measurement	0.247 in.
Head thickness minimum requirement	<u>0.044 in.</u>
Head thickness total requirement	0.106 in.
Avg. head thickness, actual measurement	0.322 in.

Attachment Number 2
Ultrasonic Thickness Measurement Data



Randers Engineering

905 W. EISENHOWER CIRCLE, SUITE 102

ANN ARBOR, MI 48103

(313) 663-0420

FAX (313) 663-0120

JOB

SHEET NO. F-001 / F-002 OF

CALCULATED BY DEB

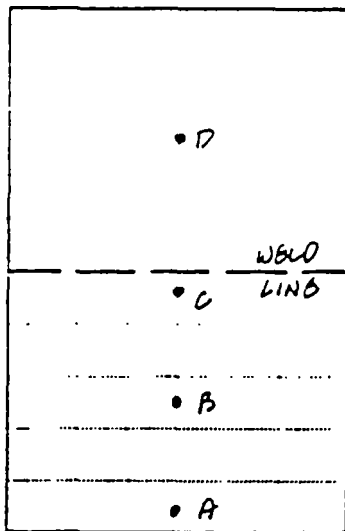
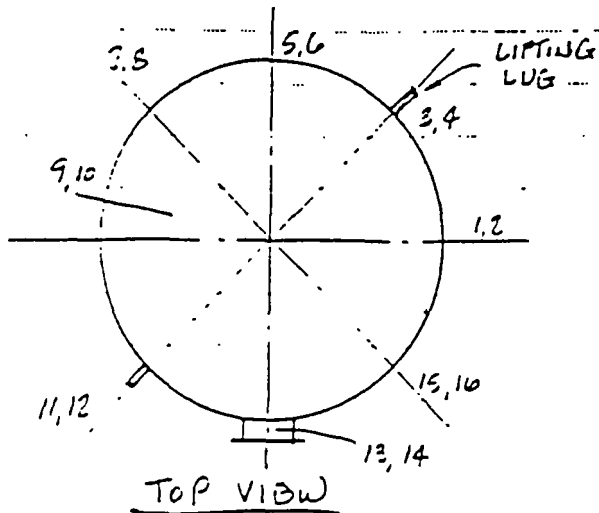
DATE 1-8-90

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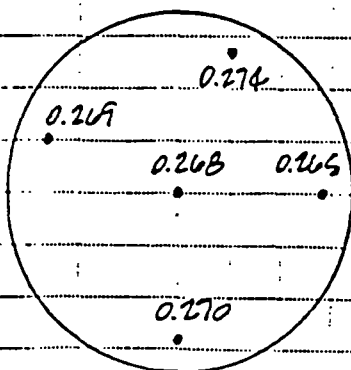
DATE

SCALE

F-001 / F-002 - 2300 Gallon Vertical Tank (6'-0" Dia x 10'-10")



FRONT VIEW



1990 DATA

NO.	UT READING	LOCATION	NO.	UT READING
1	0.250	A	1	0.248
2	0.261	C	2	0.248
3	0.251	B	3	0.255
4	0.254	D	4	0.228
5	0.252	A	5	0.245
6	0.241	C	6	0.260
7	0.254	B	7	0.253
8	0.244	D	8	0.232
9	0.252	A	9	0.246
10	0.266	C	10	0.250
11	0.249	B	11	0.235
12	0.239	D	12	0.213
13	0.260	A	13	0.233
14	0.279	C	14	0.209
15	0.244	B	15	0.240
16	0.240	C	16	0.224

NOTES:

1. Tank nozzles not shown
2. Dwg. to show approx. ultra-sonic test locations and readings.
3. Tank is covered with fiberglass insulation and aluminum jacket.
Assume paint thickness = 0.01"
4. All readings taken from inside tank



Randers Engineering

905 W. EISENHOWER CIRCLE, SUITE 102

ANN ARBOR, MI 48103

(313) 663-0420

FAX (313) 663-0120

SHEET NO. F.001 Tank

OF

CALCULATED BY DKB

DATE

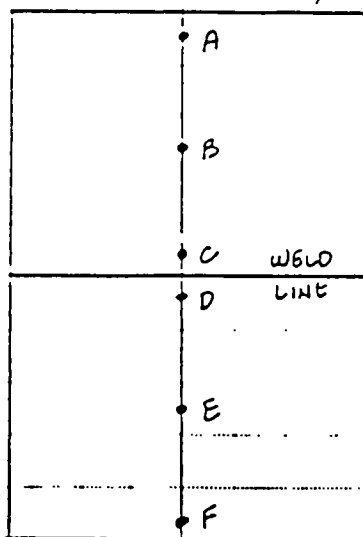
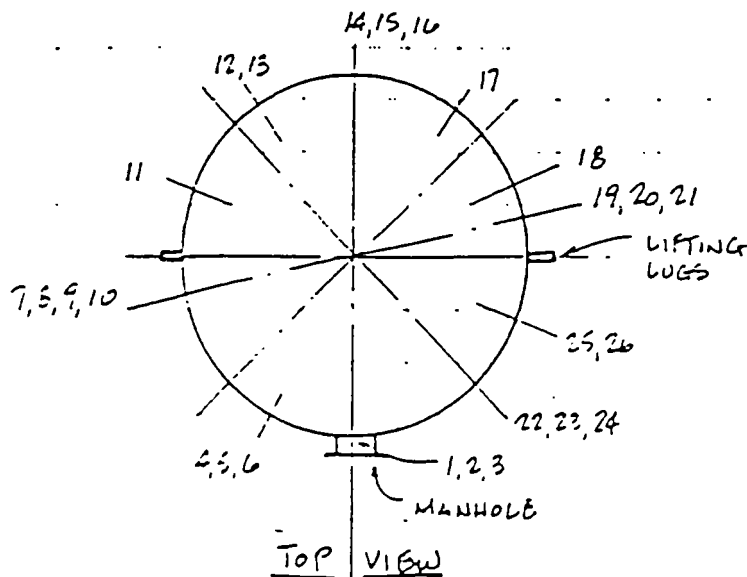
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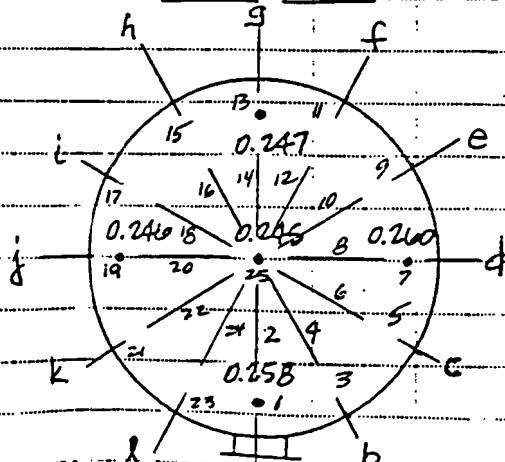
DATE

SCALE

F.001 - 4500 Gallon Vertical Tank (8'-0" Dia x 10'-10 3/4")



FRONT VIEW



1990 DATA

NO.	UT READING	LOCATION	NO.	UT READING
1	0.275	A	1	0.262
2	0.250	C	2	0.233
3	0.239	E	3	0.210
4	0.240	B	4	0.228
5	0.246	D	5	0.224
6	0.227	F	6	0.192
7	0.261	A	7	0.234
8	0.243	C	8	0.211
9	0.241	D	9	0.216
10	0.235	F	10	0.194
11	0.250	B	11	0.219
12	0.253	A	12	0.240
13	0.238	C	13	0.209
14	0.250	B	14	0.218
15	0.222 *	D	15	0.200
16	0.231	F	16	0.195
17	0.244	E	17	0.205
18	0.226	F	18	0.198
19	0.265	A	19	0.250
20	0.261	C	20	0.232
21	0.238 *	D	21	0.223
22	0.254	B	22	0.233
23	0.261	D	23	0.228
24	0.231	F	24	0.196
25	0.196 *	D	25	0.188 ^A
26	0.201 *	D	26	0.196 ^B

* Reading without Paint

A-Reading is actually #26. B-Reading is actually #

NOTES: Same as Tank F.002 (5000 Gal)

1991 DATA

No.	UT READING
7	0.253
8	0.235
9	0.246
10	0.242
11	0.257
12	0.245

UT		UT	
NO.	READING	NO.	READING
26	0.254	39	0.242
27	0.251	35	0.242
28	0.248	36	0.263
29	0.251	37	0.246
30	0.255	38	0.239
31	0.245	39	0.241
32	0.246	40	0.243
33	0.248	41	0.246

1. Tank Nozzles Not shown.
2. Dwg. To show Approx. Ultra-sonic Test Location and Reading.
3. Tank has Epoxy Coating Measured at Approx. 0.01". All measurements include thickness of Coating.
4. All readings taken from outside tank.

DETREX INTER-OFFICE CORRESPONDENCE



TO: M.J. Tepatti

FROM: R.E. Swan

CC: R. Hritzkowin, R. Jones, W. Moore, I. Shamiyeh DATE: 2/11/91

SUBJECT: Annual Assessment of Hazardous Waste Tanks at Eaton Ave.

Enclosed is the amendment to the Assessment performed on January 28, 1991. The enclosure addresses only the information missing in the original assessment. Therefore, it should be attached to it to form a complete package.

If you have any questions or concerns, please contact me.



February 11, 1991



Mr. Donald Mbamah
Michigan Department of Natural Resources
Southeast Michigan District Headquarters
38980 Seven Mile Road
Livonia, MI 48152

Dear Mr. Mbamah:

As required by Act 64, Detrex Corporation has conducted the annual assessment of hazardous waste tanks at it's TSDf located at 12886 Eaton Ave, Detroit, MI. Through comparative analysis of the original data, 1991 data received via Ultrasonic Thickness Measurement and the structural integrity calculations originally performed on the tanks, it is my opinion that the three (3) carbon steel storage tanks are structurally sound for their intended use.

I have attached a copy of the documentation of assessment procedures for your benefit.

If you have any questions regarding the procedures, data, or methodology, please feel free to contact me at your convenience.

Sincerely,

DETREX CORPORATION

A handwritten signature in cursive script, appearing to read "Ronald E. Swan, Jr.".

Ronald E. Swan, Jr.
Manager of Engineering

RS:jg

enclosure(s)

cc: R. Hritzkowin - Detrex
R.J. Jones - Detrex
W. Moore - Detrex
I.H. Shamiyeh - Detrex
M.J. Tepatti - Detrex

Attachment Number 3

4,000 Gallon Vertical Tank Head Thickness

1990 Data

No.	Location	LJT Reading
1	a	0.258
2	a	
3	b	
4	b	
5	c	
6	c	
7	d	0.260
8	d	
9	e	
10	e	
11	f	
12	f	
13	g	0.247
14	g	
15	h	
16	h	
1	i	
1	i	
19	j	0.246
20	j	
21	k	
22	k	
23	l	
24	l	
25		0.245

1991 Data

No.	Location	LJT Reading
1	a	0.243
2	a	0.235
3	b	0.248
4	b	0.242
5	c	0.242
6	c	0.228
7	d	0.262
8	d	0.241
9	e	0.243
10	e	0.235
11	f	0.240
12	f	0.236
13	g	0.233
14	g	0.227
15	h	0.233
16	h	0.220
17	i	0.231
18	i	0.228
19	j	0.235
20	j	0.218
21	k	0.233
22	k	0.200
23	l	0.243
24	l	<u>0.237</u>
25		<u>0.532*</u>

24 measurement avg. 0.234

: 2" x 2" x $\frac{1}{4}$ " Plate welded in center of tank head.

Attachment Number 4

4,000 Gallon Tank Assessment Data Summary

Corrosion Allowance	0.062 in.
Head Thickness Minimum Requirement	<u>0.074 in.</u>
Head Thickness Total Requirement	0.136 in.
Avg. Head Thickness, Actual Measurement	0.234 in.
Shell Thickness Minimum Requirement	<u>0.079 in.</u>
Shell Thickness Total Requirement	0.141 in.
Avg. Shell Thickness, Actual Measurement	0.216 in.

Randers Engineering

INCORPORATED

ENGINEERS • ARCHITECTS • CONSULTANTS • PROJECT MANAGERS

July 8, 1991

Mr. Ronald Swan
Gold Shield Solvents Division
Detrex Corporation
12886 Eaton Avenue
Detroit, MI 48227

Subject: Atmospheric Storage Tank Certification

Dear Mr. Swan:

Per our conversation of 7-2-91, we provide you with the following clarification of our May 11, 1990 letter.

Our May 11, 1990 letter provided certification for tanks F-001, F-001/F-002 (vertical tanks) and F-002 (horizontal tank) for their intended use. Our certification was based on the corrective measures that you performed based on our January 22, 1990 report.

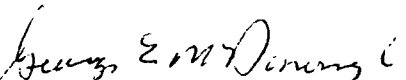
Our January 22, 1990 report recommended providing full support under the two vertical tanks F-001 and F-001/F-002. You accomplished this by forming around the tanks and pouring a self leveling grout mixture to provide this full support. We verified this work during our site visit on April 26, 1990.

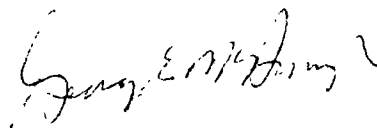
We recommended in our January 22, 1990 report that the supports for horizontal tank F-002 either be relocated or stiffening rings be added at the existing location. During our April 26, 1990 visit we observed that new saddle supports had been installed at the recommended locations. These supports were 12" wide and spanned the bottom third of the tank.

Based on the findings in our January 22, 1990 report and our site visit of April 26, 1990 verifying the corrective measure you performed we provided our certification letter of May 11, 1990.

Should you have any other questions concerning the above or have any other need for our services please do not hesitate contacting us.

Sincerely
Randers Engineering, Inc.


George E. McDonough, P.E.
Divisional Vice President



Randers Engineering

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August 29, 1991

Ronald E. Swan, Jr.
Manager of Engineering
Detrex Corporation
999 Haynes, Suite 305
Birmingham, Michigan 48008

Subject: Atmospheric Storage Tanks Certification

Dear Ron,

Per the request of Mr. Bill Moore, we have revised our August 19, 1991 letter to reflect the exact wording of 40CFR270.11 and to address the head thickness on tank F-001 (4500 gal. vertical).

Per your request, we have reviewed the use of the three storage tanks at your Eaton Avenue Plant for the storage of methylene chloride in addition to the chemicals that were being handled at the time of our May 1990 certification.

We have reviewed various chemical resistance charts (attached) and find that methylene chloride has similar corrosive properties as those chemicals previously handled. Based on this and the wall thickness measurements you provided from your 1991 assessment, we can certify that the three tanks F-001 (4500 gal. vertical), F001/F002 (2300 gal. vertical) and F-002 (5000 gal. horizontal) could be used for the storage of methylene chloride. We also reviewed the information provided on the head thickness for tank F-001 (4500 gal. vertical) showing an average thickness of 0.234" and find this suitable for the intended use.

Based on the current rate of corrosion in the wall thickness, the tanks have approximately 3 to 6 years before they will reach the required minimum wall thickness. As the wall thickness approaches the required minimum, we recommend that more frequent inspections be conducted.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on

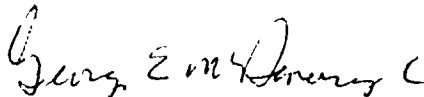
Mr. Ronald E. Swan, Jr.
August 29, 1991
Page 2

my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Ron, we trust that the above satisfies your needs at this time. Should you have any questions concerning the above or any other engineering needs, please do not hesitate contacting us.

Sincerely,

RANDERS ENGINEERING, INC.

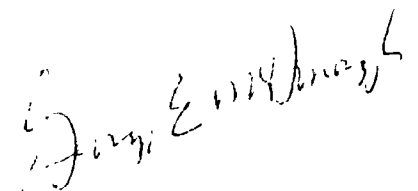


George E. McDonough, P.E.
Vice President

GEM/sre

Attachments

File: 91086SWN.DOC



HOW TO USE THE CHEMICAL RESISTANCE CHARTS

The table "Chemical Resistance Of Lining Materials" shows the lining materials, chemicals, solvents, concentration and temperature limits for use.

The lining materials are described across the top as column headings. The various rubber groups are listed in their approximate order of relative cost, with natural rubber being the lowest.

The chemicals are listed on the left hand side. These tables contain not only the common names of the chemicals, but also any names which may be synonymous. Example: Hydrochloric acid (HCL) will also be listed under muriatic acid. A chemical preceded by an asterisk indicates a solid at room temperature. Two asterisks preceding a chemical indicate a gas at room temperature. In the column headed Concentration, either the word "Any" or a percent concentration will appear. "Any" concentration refers to a water solution of a chemical from very weak to a saturation value. The percent concentration refers to a limiting ratio of chemical to water in weight percent. If the concentration is left blank, then generally that chemical will be used in its pure form and not in solution with any other compound. The temperatures shown in the tables are for pure chemicals. It is necessary that you know the concentration of any impurities, additives, solvents or emulsifiers that might be in the solution. Very small amounts of impurities can alter the characteristics of the solution.

To the immediate right of the chemicals is a list of letters that denote the common solvents for the chemical. In some instances, a reference is given to "See Solvents" on page 22. This indicates that the chemical is a solid, insoluble in water. The chemical will be dissolved in a solution of one of the indicated solvents or a solvent characteristic of the application. The table "Resistance for Chemical Solvents" on page 22 lists all those solvents in the first set of tables, and should be referred to when indicated in the chemical listing. *Always use the lowest temperature recommendation shown for either the chemical or the solvent.*

The rows of figures to the extreme right of the chemicals, each in a column for a given lining material, indicate the maximum recommended temperature which will give satisfactory service with the tank lining. In some instances, a lining material will be given a rating of 75°Fahrenheit for a particular chemical. This indicates that the chemical was determined to be satisfactory at room temperature, has a possibility for use and could be tried at somewhat higher temperatures. In both sets of charts, a blank space in any material column indicates we have no available data. In such cases, Gates will provide rubber immersion samples that the customer can use for testing. Immersion tests will be conducted in our own laboratories if the customer will provide us a two-quart sample of the chemical solution.

Sometimes a number of materials will be suitable for a particular application. In these cases, the material showing the highest temperature limit may be expected to give longer service.

CHEMICAL RESISTANCE FOR LINING MATERIALS			Salt Natural Rubber	Hard Natural Rubber	Butyl	Neoprene®	Buna N	PVC	Fiberglass Resins	Mild Steel	316 Stainless	Aluminum	Lead	Glass	Concrete	Wood
Solvents		Concentration														
Methanol	a, e, w	Any	100	-	185	100	150	120	100	150	150	90	150	210	75	75
Methanecarboxylic Acid		See Acetic Acid														
Methyl Acetate	hc, w	Any	x	-	x	x	x	-	-	75	-	-	-	75	-	-
Methyl Acrylate	w	Any	x	-	x	x	x	-	-	75	-	75	-	75	-	-
Methyl Alcohol	a, e, w	Any	100	-	185	100	150	120	100	150	150	90	150	210	75	75
Methylbenzene	a, b, e	100	x	x	x	x	x	150	170	170	170	170	170	170	-	-
Methyl Butanol	a, e, w	Any	150	-	180	180	180	150	-	70	70	75	-	140	-	-
Methyl Butyl Ketone	a, e, w	Any	x	-	150	x	x	x	x	-	-	150	-	-	-	-
Methyl Chloride **	a, b, cl, ct, os, w	Any	x	-	80	x	x	x	75	x	100	x	-	210	-	70
Methylene Chloride	a, e	100	x	-	x	x	x	x	x	100	70	100	70	75	-	-
Methylene Chlorobromide	os	100	x	x	x	x	x	x	-	150	150	x	70	210	-	75
Methylene Dichloride	a, e	100	x	-	x	x	x	x	-	100	70	100	70	75	-	-
Methyl Ethyl Ketone	a, e, o, w	Any	x	x	100	x	x	x	x	150	150	150	150	210	170	-
Methyl Hexyl Carbinol	a, cl, e	100	x	-	x	x	100	x	150	-	-	-	-	175	-	-
Methyl Isobutyl Ketone	a, e, w	Any	x	-	x	x	x	-	-	75	70	-	-	75	-	-
Methyl Isobutyl Ketone	a, e, w	Any	x	-	75	x	x	x	70	150	150	150	150	210	-	-
Methyl Isopropyl Ketone	w, os	Any	x	-	x	x	x	x	-	-	-	-	-	-	-	-
Methyl Methacrylate	w	Any	x	-	x	x	x	x	-	x	70	70	-	75	-	-
Methylphenol	a, e, gl, ho, w	Any	x	-	x	x	x	x	75	75	100	100	x	210	x	75
Methyl Polysiloxanes		100	x	-	x	x	180	-	-	-	-	-	-	-	-	-
Methylpropanol	a, e, w	Any	80	-	100	80	80	80	-	-	-	-	-	-	-	-
Methylpropylbenzene	a, cl, e	100	x	-	x	x	x	x	-	-	-	-	-	-	-	-
Methyl Salicylate	aa, e, w	Any	x	-	80	-	x	x	75	75	-	75	-	75	-	-
Milk Acid	a, e, gl, w	50	120	-	150	80	80	130	100	x	70	70	x	200	x	75
Milk of Magnesia *	am, h, w	Any	150	185	185	200	200	130	75	70	70	x	x	140	-	75
Milk, Whole		100	x	-	100	100	100	170	170	150	200	-	-	170	-	-
Mineral Oil		100	x	-	x	x	150	150	-	110	70	170	110	170	-	-
Mineral Pitch		100	x	x	x	80	150	150	-	170	170	70	170	170	-	-
Mineral Spirits		100	x	x	x	x	x	x	75	75	70	75	-	75	x	-
Mineral Thinner		100	x	x	x	x	x	x	75	75	70	75	-	75	x	-
Mineral Turpentine *	a, b, e	See Solvents														
Mirabilite *	gl, w	Any	150	-	185	200	200	150	100	140	180	150	140	210	x	75
Molasses	w	Any	150	185	185	200	200	150	-	-	-	-	-	-	-	-
Molybdate *	a, gl, w	Any	150	185	180	80	200	150	200	x	x	x	x	210	x	75
Monobromo Benzene		Any	x	-	x	x	x	x	-	-	-	-	-	100	-	-
Monobromotrifluoromethane **		100	x	-	x	x	x	x	-	x	75	70	100	75	-	-
Monochloroacetic Acid *	a, e, w	10	x	x	150	x	x	x	200	-	70	-	-	-	-	-
Monochloro Benzene		Any	x	-	x	x	x	x	x	75	70	-	x	210	-	-
Monochlorodifluoromethane **		100	x	-	x	x	x	x	-	x	75	70	100	75	-	-
Monochlorotrifluoromethane **		100	x	-	x	x	x	x	-	x	75	70	100	75	-	-
Monoethanolamine	a, cl, ct, w	Any	80	80	140	80	80	-	210	150	150	75	-	210	200	75
Monomethylether		100	x	-	80	x	100	x	-	-	-	-	-	-	-	-
Monosodium Acid Methanearsenate		25	-	185	200	180	-	-	-	-	-	-	-	-	-	-
Monovinyl Acetate		100	x	-	-	x	x	-	-	-	-	-	-	-	-	-
Monsel's Salt *	w	Any	150	185	185	200	200	150	75	x	70	x	75	210	x	-
Morea Premix		150	-	150	-	-	-	-	-	-	-	-	-	-	-	-
Morrhua Oil	ae, a, cb, cl, e, pe	100	x	x	150	-	120	-	-	-	-	-	-	-	-	-
Motor Spirits		100	x	-	x	x	100	100	75	170	70	170	170	170	-	-
Muriatic Acid		See Hydrochloric Acid														
Mustard			x	-	-	-	-	-	-	-	-	-	-	-	-	-
Muthman's Liquid	a, e	100	x	-	x	x	x	x	-	-	-	-	-	-	-	-
Myristic Acid *	a, e	See Solvents														
Naptha		100	x	x	x	x	x	x	100	75	70	75	-	75	x	-
Napthalene *	a, b, e	See Solvents														
Napthenic Acid	hc, os, w	Any	x	-	x	-	x	-	-	130	200	130	-	210	-	-
Naphthylbenzene	a, b, e	100	x	x	x	x	x	150	170	170	170	170	170	170	-	-
Natural Gas **			x	x	x	x	x	x	-	170	170	170	170	170	-	-
Navee		-	-	-	-	-	70	-	-	-	170	-	-	-	-	-
Nickel Acetate *	a, w	Any	80	185	-	-	-	-	-	-	70	-	-	75	-	-
Nickel Chloride *	ho, w	Any	150	185	150	200	200	150	200	x	70	x	100	140	-	-
Nickel Nitrate *	a, w	Any	150	185	150	200	200	150	200	70	70	x	70	210	-	-
Nickel Salts *	a, w	Any	150	185	185	200	200	150	100	x	70	x	70	120	x	-
Nickel Sulfate *	a, w	Any	150	185	185	200	200	150	200	x	70	x	70	120	x	-
Nicotine Bentonite		Any	150	-	185	200	200	150	-	-	-	-	-	-	-	-
Nicotine Sulfate *	a, e, w	Any	150	-	185	200	200	150	-	-	70	70	-	75	-	-
Niter *	a, gl, w	Any	150	180	185	200	180	150	150	130	130	180	70	210	75	x
Niter Cake *	w	Any	150	185	185	200	160	150	100	x	150	x	70	200	x	75
Nitric Acid		10	x	-	100	x	x	150	125	x	200	70	x	400	x	x
		25	x	-	75	x	x	115	125	x	175	x	x	400	x	x
		40	x	-	x	x	x	100	80	x	140	x	x	400	x	x
Concentrated Fuming			x	-	x	x	x	x	x	x	70	70	x	210	x	-
Nitrobenzene *	a, b, e, w	Any	x	-	80	x	x	x	75	170	150	150	70	210	-	-
Nitrocalcite *	a, ac, w	Any	150	185	185	200	200	150	100	100	130	70	x	100	x	75
Nitro Ethane	w	Any	80	-	80	x	x	80	-	75	75	75	-	75	-	-
Nitrogen **		100	150	185	185	200	200	-	-	-	-	-	-	-	-	-
Nitrogen Dioxide **	w	Any	See Nitric Acid													
Nitrogen Fertilizer Solution			150	185	150	150	150	-	-	-	-	-	-	-	-	-
Nitrogen Peroxide **	w	Any	See Nitric Acid													
Nitrogen Tetraoxide **			See Nitric Acid													
Nitrohydrochloric Acid		Conc.	x	x	x	x	x	x	-	x	x	x	-	75	-	-
Nitro Methane	w	Any	80	-	80	x	x	80	-	75	75	75	-	75	-	-
Nitromuriatic Acid			x	x	x	x	x	x	-	x	x	x	-	75	-	-
Nitropropane	w	Any	x	-	80	-	x	80	-	75	75	75	-	75	-	-
Nitroxanthic Acid *	a, b, cl, e, w	Any	x	-	-	x	x	75	x	70	x	x	210	x	-	-
Norge Niter *	a, ac, w	Any	150	185	185	200	200	150	100	100	130	70	x	100	x	75
Norway Saltpeter *	a, ho, w	Any	150	150	185	200	200	150	100	100	130	70	x	100	x	75
Norwegian Saltpeter *	a, ac, w	Any	150	185	185	200	200	150	100	100	130	70	x	100	x	75
NPN		100	-	-	120	-	-	120	-	-	-	-	-	-	-	-
Octadecatrienoic Acid	os	100	x	-	80	150	x	80	200	-	70	70	-	-	-	-
Octadecenoic Acid	a, e, os	100	x	-	x	x	150	150	x	70	100	70	x	210	x	75
Octafluorocyclobutane		100	x	-	x	x	x	x	-	x	75	70	100	75	-	-
Octanol	a, cl, e	100	x	-	x	x	100	x	140	-	-	-	-	140	-	-

Unmarked chemicals are liquids at room temperature *Indicates a solid at room temperature. **Indicates a gas at room temperature. xLining material not recommended -No information available.



Corrosion Resistance Chart

G—Good F—Fair D—Depends on Conditions P—Poor

Media	Aluminum	Alloy Steel	Bronze	Carbon Steel	Ductile Iron	304 S.S.	316 S.S.	Hastelloy	Monel	7740 Glass	Buna-N	Kynar	Neoprene	TFE	Viton
Lactic Acid (Conc. Hot)	G	G	F	P	P	G	G	D	D	G	G	D	F	G	G
Linoleic Acid	G	G	F	P	P	G	G	D	D	G	G	D	F	G	G
Magnesium Bisulfate	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Magnesium Chloride	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Magnesium Hydroxide	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Magnesium Hydroxide (Hot)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Magnesium Sulfate Solutions	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Mercuric Chloride	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Mercuric Cyanide	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Mercury	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Methyl Acetate	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Methyl Acetone	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Methyl Alcohol	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Methylamine	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Methyl Cellosolve	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Methyl Chloride (Wet)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Methyl Ethyl Ketone	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Methyl Formate	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Methylene Chloride	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Milk	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Mixed Acids (Cold)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Molasses	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Naptha	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Napthalene	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Natural Gas	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Nickel Ammonium Sulfate	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Nickel Chloride	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Nickel Sulfate	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Nicotinic Acid	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Nitric Acid 10%	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Nitric Acid 80%	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Nitric Acid Anhydrous	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Nitrobenzene	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Nitrous Gases	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oil, Animal	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oil, Cottonseed	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oil, Fish	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oil, Fuel	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oil, Lube	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oil, Mineral	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oil, Petroleum (Refined)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oil, Petroleum (Sour)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oleic Acid (Hot)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oleum Spirits	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oxalic Acid (Cold)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Oxygen	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Ozone (Wet)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Ozone (Dry)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Paints and Solvents	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Palmitic Acid	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Perchloroethylene (Dry)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Phenol	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Phosphoric Acid 85% (Hot)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Phosphoric Acid 85% (Cold)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Phosphoric Acid 50% (Hot)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Phosphoric Acid 50% (Cold)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Phosphoric Acid 10% (Hot)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Phosphoric Acid 10% (Cold)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Picric Acid Solutions (Cold)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Chloride Solutions	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Cyanide Solutions	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Hydroxide (Dilute Hot)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Hydroxide (Dilute Cold)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Hydroxide (to 70% Hot)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Hydroxide (to 70% Cold)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Nitrate	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Phosphate (Monobasic)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Phosphate (Dibasic)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Phosphate (Tribasic)	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Sulfate	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Sulfide	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Potassium Sulfite	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G
Propene	G	G	D	P	P	G	G	D	D	G	G	D	F	G	G

Note: The information given in this table has been tabulated from various references, for use as a general guide. Before specific applications are made all service conditions, such as pressures, temperatures, concentrations, operating cycles, etc., should be reviewed with the manufacturer or fabricator.

NIBCO CHEMICAL RESISTANCE GUIDE FOR VALVES & FITTINGS

INTRODUCTION

This chemical resistance guide has been compiled to assist the piping system designer in selecting chemical resistant materials. The information given is intended as a guide only. Many conditions can affect the material choices. Careful consideration must be given to temperature, pressure and chemical concentrations before a final material can be selected.

Thermoplastics and elastomers physical characteristics are more sensitive to temperature than metals. For this reason, a rating chart has been developed for each.

MATERIAL RATING FOR THERMOPLASTICS & ELASTOMERS

Temp. in °F	= "A" rating, maximum temperature which material is recommended, resistant under normal conditions
B to Temp. in °F	= Conditional resistance, consult factory
C	= Not recommended
Blank	= No data available

MATERIAL RATINGS FOR METALS

A	= Recommended, resistant under normal conditions
B	= Conditional, consult factory
C	= Not recommended
Blank	= No data available

Temperature maximums for thermoplastics, elastomers and metals should always fall within published temp/pressure ratings for individual valves. **THERMOPLASTICS ARE NOT RECOMMENDED FOR COMPRESSED AIR OR GAS SERVICE.**

This guide considers the resistance of the total valve assembly as well as the resistance of individual trim and fitting materials. The rating assigned to the valve body plus trim combinations is always that of the least resistant part. In the cases where the valve body is the least resistant, there may be conditions under which the rate of corrosion is slow enough and the mass of the body large enough to be usable for a period of time. Such use should always be determined by test before installation of the component in a piping system.

In the selection of a butterfly valve for use with a particular chemical, the liner, disc, and stem must be resistant. All three materials should carry a rating of "A". The body of a properly functioning butterfly valve is isolated from the chemicals being handled and need not carry the same rating.

THERMOPLASTICS & ELASTOMERS

ABS — (Acrylonitrile-Butadiene-Styrene) Class 4-2-2 conforming to ASTM D1788 is a time proven material. The smooth inner surface and superior resistance to deposit formation makes ABS drain, waste, and vent material ideal for residential and commercial sanitary systems. The residential DWV system can be exposed in service to a wide temperature span. ABS-DWV has proven satisfactory for use from -40°F to 180°F. These temperature variations can occur due to ambient temperature or the discharge of hot liquids into the system. ABS-DWV is very resistant to a wide variety of materials ranging from sewage to commercial household chemical formulations. ABS-DWV is joined by solvent cementing or threading and can easily be connected to steel, copper, or cast iron through the use of transition fittings.

CPVC — (Chlorinated Polyvinyl Chloride) Class 23447-B, formerly designated Type IV, Grade 1 conforming to ASTM D-1784 has physical properties at 73°F similar to those of PVC, and its chemical resistance is similar to or generally better than that of PVC. CPVC, with a design stress of 2000 psi and maximum service temperature of 210°F, has proven to be an excellent material for hot corrosive liquids, hot and cold water distribution, and similar applications above the temperature range of PVC. CPVC is joined by solvent cementing, threading or flanging.

P.P. (Polypropylene) — (PP) Type 1 Polypropylene is a polyolefin which is lightweight and generally high in chemical resistance. Although Type 1 polypropylene conforming to ASTM D-2146 is slightly lower in physical properties compared to PVC, it is chemically resistant to organic solvents as well as acids and alkalies. Generally, polypropylene should not be used in contact with strong oxidizing acids, chlorinated hydrocarbons, and aromatics. With a design stress of 1000 psi at 73°F, polypropylene has gained wide acceptance where its resistance to sulfur-bearing compounds is particularly useful in salt water disposal lines, crude oil piping, and low pressure gas gathering systems. Polypropylene has also proved to be an excellent material for laboratory and industrial drainage where mixtures of acids, bases, and solvents are involved. Polypropylene is joined by the thermo-seal fusion process, threading or flanging. At 180°F., or when threaded, P.P. should be used for drainage only at a pressure not exceeding 20 psi.

PVC — (Polyvinyl Chloride) Class 12454-B, formerly designated Type 1, Grade 1. PVC is the most frequently specified of all thermoplastic materials. It has been used successfully for over 30 years in such areas as chemical processing, industrial plating, chilled water distribution, deionized water lines, chemical drainage, and irrigation systems. PVC is characterized by high physical properties and resistance to corrosion and chemical attack by acids, alkalies, salt solutions, and many other chemicals. It is attacked, however, by polar solvents such as ketones, some chlorinated hydrocarbons and

CHEMICAL RESISTANCE GUIDE FOR VALVES AND FITTINGS

CHEMICALS AND FO A	CONCENTRATION	PLASTICS AND ELASTOMERS AT MAXIMUM TEMPERATURE (°F)											METALS																		
		ABS	CPVC	PP	PVC	PVDF	TEFLON	EPDM	BUNA-N	HYALON	NEOPRENE	FLUORO- CARBON	ALUMINUM	COPPER	BRONZE (85% Cu)	SILICON BRONZE	ALUMINUM BRONZE	STAINLESS STEEL	GRAY IRON	DUCTILE IRON	CARBON STEEL	3% Ni/IRON	NI PLATED DUCTILE	400 SERIES S.S.	316 S.S.	17-4 PH	ALLOY 20	MONEL	STELLITE	HASTELLOY C	
Methyl Acetone C ₃ H ₈ O					C		70	C	C		C		A	A	A					A	A	A	A	A	A	A	A	A	A	A	
Methyl Acrylate H ₂ CHOOCH ₃	Tech Pure				100	300	B to 70	C	C	C	C													A		A	A				
Methyl Amine H ₃ NH ₂			C	C	C	300	70			70	100							A	A	B		A				A	C				
Methyl Bromide H ₃ Br					C	280	300	C	70	C	C	185		C	C	B		C						B			B	B			
Methyl Cellosolve OCH ₂ CH ₂ °CH ₃					C	280		70	C	70	70			A	A	B			B	B			A	A							
Methyl Chloride H ₃ Cl	Dry	C			C	280	250	C	C	C		70	C		A	A	C		A	A	A	A	A	A	A						A
Methyl Chloroform H ₃ CCl		C	C			125	200	C	C		C	70						A	A			A		A							
Methyl Ethyl Ketone (MEK) H ₃ COC ₂ H ₅			C	C	C	C	200	70	C	C	C	C		A				A					A	A	A	A	A	A	A	A	A
Methyl Formate COOCH ₃							100	C	C	70	C				A	A			A	C			A	A	A	A	A	A			A
Methyl Isobutyl Carbinol H ₃) ₂ CHCH ₂ CH(CH ₃)OH						200	70	70	70	70	70																				
Methyl Isobutyl Ketone H ₃) ₂ CHCH ₂ COCH ₃			C	C	C	C	200	70	C	C	C	C												A	A	A	A	A			
Methyl Isopropyl Ketone H ₃ COCH ₂ (C	150	C	C	C																					
Methyl Methacrylate H ₂ C(CH ₃)COOH ₃					73	125	150	C	C	70	C									C											
Methyl Sulfate H ₃) ₂ SO ₄					73	280	70																								
Ethylene Bromide H ₂ Br ₂					C	175	250					70																			
Ethylene Chloride H ₂ Cl ₂					C	C	250							B	B	B			B	B	B				A	A	A	A			A
Ethylene Chlorobromide H ₂ ClBr					C				C		C								A	A				A		A					
Ethylene Iodide H ₂ I ₂					C	200	250					250																			
Ethyl Alcohol H ₃ CH ₂ OH																															
Gasoline			70	170		225	400	250	180	200	160	300	C		B	B	B	B	C	C	C		C	C	A	A	A	A			
Mineral Oil			70	185	120	140	200	300	C	140	B to 70	70	300	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Alkylbenzenes					73	140	150	300	100	150	150	185		A	A	A	A	A	A	A			A	A	A	A	A				A
Monochloroacetic Acid H ₂ ClCOOH	50%		73	73	140	150	200					70		C	C	C	C	C	C	C		C	C	C	C	B	B				
Monochlorobenzene H ₃ Cl	Tech. Pure			73		170	200				C	70			A	A			A	A	A	A	A	A	A	A	A	A	A		
Monochloroethane H ₃ CH ₂ CH ₂ Cl					C	C	100	70	70	C	C	185					C		B	B	B		B		A		A	B			
Motor Oil			185	73	140		350	C	180			250	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
Nitrophenol H ₃ ONH ₂						75	200	70	C	C	C	C			B	B			B	B	B		B	B	B	B	B	B			

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SECTION E

ENVIRONMENTAL MONITORING

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SECTION E

ENVIRONMENTAL MONITORING

This section of the operating license application provides a hydrogeologic report pertaining to the Detrex Corporation facility in Detroit, Michigan as required by Michigan Act 64 Rule 299.9506(1) and (2). This section also provides a justification for waiver for a groundwater monitoring program and for an annual soil monitoring program pursuant to Rule 299.9611(3) and Rule 299.9611(4), respectively.

E-1 HYDROGEOLOGIC REPORT (Rule 299.9506)

A hydrogeologic investigation was conducted at the Detrex Corporation facility in Detroit, Michigan. A hydrogeologic report which details the field activities of the investigation and summarizes all the data collected is presented in Attachment E-1. Attachment E-2 provides a Plan of Survey completed and certified by Warner Cantrell & Padmco, Inc. The location of the monitoring well and boreholes are shown. The Facility Plan presented in Attachment E-3 locates all hazardous waste management units. In addition to the hydrogeologic report presented in Attachment E-1, the following information is presented to satisfy the requirements of Rule 299.9506(1).

**E-1a Interim Status Period Groundwater Monitoring
[Rule 299.9506(1)(a)]**

No interim status groundwater monitoring was required for the hazardous waste container and tank storage areas.

E-1b Identification of Uppermost Aquifer [Rule 299.9506(1)(b)]

As discussed in the engineering report presented in Attachment E-1, the uppermost aquifer beneath the facility property was located at approximately 100 feet below ground surface (557 feet AMSL). The uppermost aquifer consisted of a confined, unconsolidated, sand aquifer with a hydraulic conductivity of approximately 1×10^{-3} cm/sec. The aquifer is overlain by approximately 100 feet of unsaturated lacustrine silty clay/clayey silt with a hydraulic conductivity of less than 1×10^{-7} cm/sec.

As discussed in Section 1.0 of the engineering report presented in Attachment E-1, it was agreed with the MDNR, prior to and during the hydrogeologic investigation field activities, that due to the hydrogeologic conditions at the Site, only one borehole would be required to be advanced to the underlying aquifer and instrumented as a monitoring well. As such groundwater flow direction and rate were not determined during the hydrogeologic investigation. Groundwater flow in the confined aquifer, however, is assumed to be east-southeast towards Lake St. Clair.

E-1c Identification of Aquifers Utilized [Rule 299.9506(1)(c) and (f)]

A well survey was conducted by McDowell and Associates of Ferndale, Michigan. There are no available records of any domestic, municipal, industrial, oil and gas wells and soil borings within a one-mile radius of the Site on record with the MDNR.

As discussed in Section J-2 of this operating license application, the City of Detroit covers much of Wayne County. Detroit derives its water from surface sources. As such, very little groundwater is exploited in Wayne County. Of the 42 communities in Wayne County, 38 of these communities purchased water from another community, and four of these communities were supplied by surface water (EPA, 1981).⁽¹⁾ No community in the County reported the use of groundwater as a municipal supply source. Within ten miles of the Site, no major water course or water body exists.

E-1d Other Aquifers [Rule 299.9506(d)]

As discussed in Section J-2 of this operating license application, material in Wayne County consists primarily of silts and clays with the occasional glacial moraine deposits. This thick layer of lacustrine material mantles a bedrock of sandstones, limestones, shales and dolomites. The downward sequence of the various bedrock formations beneath Wayne County includes the following:

Mississippian

Coldwater Shale - This unit exists at the northwest corner of Wayne County. The unit outcrops and subcrops in this area. The unit generally has low permeability.

Devonian

Berea Sandstone - This moderately fine grained sandstone can be 100 feet in thickness in spots.

Traverse Group - This alternating sequence of shales and limestones outcrops in the central portions of Wayne County.

(1) "Hydrogeology for Underground Injection Control in Michigan: Part 1, 1981" USEPA.

Dundee Limestone - This unit is a fossiliferous limestone with high permeability.

Detroit River Group - This group includes sandstones, limestones and dolomite.

Sylvania Sandstone - This unit outcrops in the southeast reaches of Michigan.

Silurian

Bass Leland Group - This group is composed of fine grained dolomites.

Of the formations listed above, the following formations are reported to be used as a water supply source in Wayne County: Berea Sandstone, Traverse Group, Dundee Limestone, Detroit River Group, and the Sylvania Sandstone.

Several injection wells are located within Wayne County. Six Class I injection wells are used to inject industrial, nuclear or municipal wastes beneath the deepest stratum containing an underground drinking water source. Eight injection wells used for injecting fluids for solution mining, oil shale gasification or geothermal energy recovery are also reported for Wayne County. Thirty wells are reported to be used for Liquified Petroleum Gas storage. No brine injection wells are recorded in Wayne County.

As discussed in Section E-1c, no community reported the use of groundwater as a municipal supply source. A number of non-community sources outside the Detroit City limits however have been recorded. Those geologic units capable of supplying water are summarized above. The table below summarizes the information as provided by the EPA (1981).⁽¹⁾

<i>Aquifer System</i>	<i># of Wells</i>	<i>Depth (ft)</i>	<i>Capacity (gpm)</i>
Glacial Drift Aquifer	15	62 - 122	13 - 4,000
Berca Sandstone	2	207 - 234	5 - 30
Traverse Group	1	126	100
Dundee Limestone	1	183	110
Detroit River Group	5	28 - 102	15 - 41
Sylvania Sandstone	2	66 - 135	50 - 300
Silurian-Devonian	1	475	40

The water quality from the bedrock aquifers is normally good. Water which is extracted from greater depths tends to have higher sulphate concentrations due to the presence of gypsum at depth. Limestone bedrock aquifers also tend to have increases in total dissolved solids. In general, however, natural groundwaters in Wayne County have inorganic concentration measurements below EPA established guidelines.

E-1e Hazardous Waste Management Area [Rule 299.9506(1)(e)]

The hazardous waste container and tank storage areas, the drum loading/unloading area, the solvents reclamation area and product drum storage area are located on the figure presented as Attachment E-3. As well, the Transfer Facility operated outside on the northeast corner of the building is shown. As is discussed subsequently in Section E-2, Detrex Corporation requests a waiver from groundwater monitoring. Therefore, the point of compliance, as defined under the provisions of 40 CFR § 264.95 and the location of groundwater monitoring wells as required under the provisions of 40 CFR § 264.97 are not applicable. The information, to the extent possible, required under the provisions of 40 CFR § 270.14(c)(2) was presented and discussed in Section E-1(b).

E-1f Contaminant Plume Description [Rule 299.9506(g)]

As stated in Section E-1(a) no interim status groundwater monitoring was required for the hazardous waste container and tank storage areas.

E-2 GROUNDWATER MONITORING PROGRAM WAIVER
[Rule 299.9611(3)]

Detrex Corporation requests a waiver from the Director pursuant to Rule 299.9611(3) from the requirement under Rule 299.9611(2)(a) for a detection monitoring program which meets the requirements of Rule 299.9612 and the provisions of 40 CFR § 264.98.

As discussed in Section D-1, the hazardous waste container storage and tank areas, for which this operating license is being applied for, are located inside a totally enclosed building. The building provides protection from precipitation and run-on into the secondary containment system. The building floor, which encompasses the entire facility, is constructed of concrete with peripheral concrete curbing to provide secondary containment. All doorways are diked with concrete ramps. The peripheral concrete curbing is coated with Surewall Surface Bonding Cement Coating. There are no floor drains or other such openings in the secondary containment area.

All existing expansion joints and any cracks, if identified, in the building floor will be cleaned out and saw cut if necessary to provide a clean opening. Subsequently, all expansion joints and any cracks will be filled with a compatible chemically resistant flexjoint sealant. The selected sealant will be installed in accordance with the manufacturer's specifications. The concrete slab and perimeter diking, with sealed joints, will serve as an impervious containment structure, thus eliminating the potential for the release of spilled liquids from within the facility.

Periodically, bulk shipments of hazardous waste are received at the facility via tanker trucks. The bulk shipments are received at the loading/unloading dock located on the east side of the facility. A program that provides secondary containment to this area is described in Section D. Bulk waste is pumped directly into one of the two hazardous waste storage tanks from the delivery tanker truck via a system of vacuum tubing with quick release couplings installed within the facility. Material may also be transferred into DOT approved 550-gallon totes or 55-gallon gallon drums, as necessary. All pumping is conducted under procedures designed to minimize the risk of a possible spill of the hazardous waste.

In summary, the management of hazardous wastes container and tank storage areas, limits the impact of potential spills to a properly designed and maintained secondary containment system within the building. A program to ensure secondary containment of the

loading/unloading area is being conducted. No ignitable, reactive or incompatible wastes are stored within the facility. The outdoor Transfer Facility which is operated at the facility is permitted to receive flammable and other categories of wastes, however it is operated independently of the TSD operation and the secondary containment systems do not overlap, preventing a potential mixing of different wastes.

In the unlikely event of a release of hazardous waste, clean-up procedures as detailed in the Contingency Plan (see Section G) and presented below would be immediately implemented.

- a) Clean-up of released waste: The waste will be collected via use of absorbent material for small spills. The contaminated material will then be placed in open-top steel drums and transported off site for treatment/disposal at permitted facilities. For large spills, the waste will be collected with a pump and placed in steel drums for reclamation. The balance shall be cleaned up with absorbent material as stated above.
- b) Decontamination: Following cleanup with absorbent material, the affected area of the secondary containment area will be swept and all sweepings will be drummed. The pad may be subsequently decontaminated by steam cleaning. Any wash waters generated will be collected in drums and transported off site for treatment/disposal at permitted facilities.
- c) Cleanup of Contamination Soil: Should the spill or release occur outside the secondary containment area (i.e. external to the building or loading/unloading area), cleanup will be accomplished by a firm specializing in such procedures. All visually contaminated soils, where practical (ie. excavations may be restricted by building foundations), will be excavated and disposed of as appropriate, at a permitted hazardous waste facility.

The potential for a release of soil, discussed above, will be effectively eliminated by the provisions of secondary containment for the loading/unloading area. Nevertheless, as discussed in Section E-1b and in the hydrogeologic report presented in Attachment E-1, the uppermost aquifer beneath the facility property is located at approximately 100 feet below ground surface (557 feet AMSL). The uppermost aquifer is overlain by approximately 100 feet of unsaturated lacustrine silty clay/clayey silt with a hydraulic conductivity of less than 1×10^{-7} cm/sec. There is approximately three to four feet of sand and gravel fill and native material overlying the clay. There

were no perched zones noted in or above the clay. There were no fractures noted in the clay and the average moisture content of the clay being at 15 percent, would preclude the potential of fractures with the exception of desiccation cracks at the upper clay surface, during dry months.

Therefore, it can be concluded that, in the extremely unlikely event of a spill or release occur to the soils underlying or surrounding the secondary containment area, the 100 feet of low permeability clay would mitigate the release of any hazardous constituents to the uppermost aquifer. The solvents stored at the facility include: 1,1,1-trichloroethane, trichloroethene, methylene chloride, tetrachloroethane and trichlorotrifluoroethane. For these compounds to enter the clay, they must overcome the capillary or breakthrough pressure that would exist at the compound-clay interface. Clay has historically been shown to provide a barrier to the downward migration of non-aqueous phase liquids. Moreover, any aqueous phase contaminant that may result from dissolution processes, will be taken up as part of the porous medium through adsorption. This process of adsorption in conjunction with the unsaturated nature of the clay, will severely retard the migration of the aqueous phase contaminant.

E-3 ANNUAL SOIL MONITORING PROGRAM WAIVER

Detrex Corporation requests a waiver from the Director pursuant to Rule 299.9611(4) from the requirement under Rule 299.9611(2)(c) for an annual soil monitoring program.

Hazardous waste handling, associated with the container storage area that is conducted outside the totally enclosed building structure, is the unloading of drummed waste. Wastes are delivered to the facility by truck in 55 gallon drums. The truck backs up to the loading dock along the east side of the building (see Attachment E-3). Waste drums are transferred with a forklift from the truck directly to the container storage area.

Hazardous waste handling, associated with the tank storage area, that is conducted outside of the totally enclosed building structure, is the pumping of bulk hazardous waste. Wastes are delivered to the facility by tanker trucks. The truck backs up to the loading dock along the east side of the building (see Attachment E-3). Bulk waste is pumped directly into hazardous waste storage tanks via a system of vacuum tubing with quick release coupling installed within the facility.

A concrete pad directly underlies the loading/unloading area where the truck sits during the unloading operation. Peripheral drive-over concrete curbing is to be installed around the concrete pad. All expansion joints and any existing cracks in the concrete pad will be cleaned out, saw cut if necessary to provide a clean opening. Subsequently, all expansion joints and any cracks will be filled with a compatible chemically resistant flexjoint sealant. The selected sealant will be installed in accordance with the manufacturer's specifications. The concrete pad and peripheral concrete curbing, with sealed joints, will provide control against the contact of any potentially spilled liquids with the surrounding ground surface.

To date there have been no recorded spills of hazardous waste on the unloading area or surrounding soils.

Absorbent material is currently present and will continue to remain present to collect spillage from the concrete pad if it should occur during any hazardous waste transfer operations.

In addition, all unloading operations are conducted under the supervision of Detrex personnel. The area is inspected at the conclusion of unloading operations to ensure no spillage has occurred.

ATTACHMENTS

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ATTACHMENT E-1

HYDROGEOLOGIC REPORT

DETREX CORPORATION
EATON AVENUE FACILITY
DETROIT, MICHIGAN

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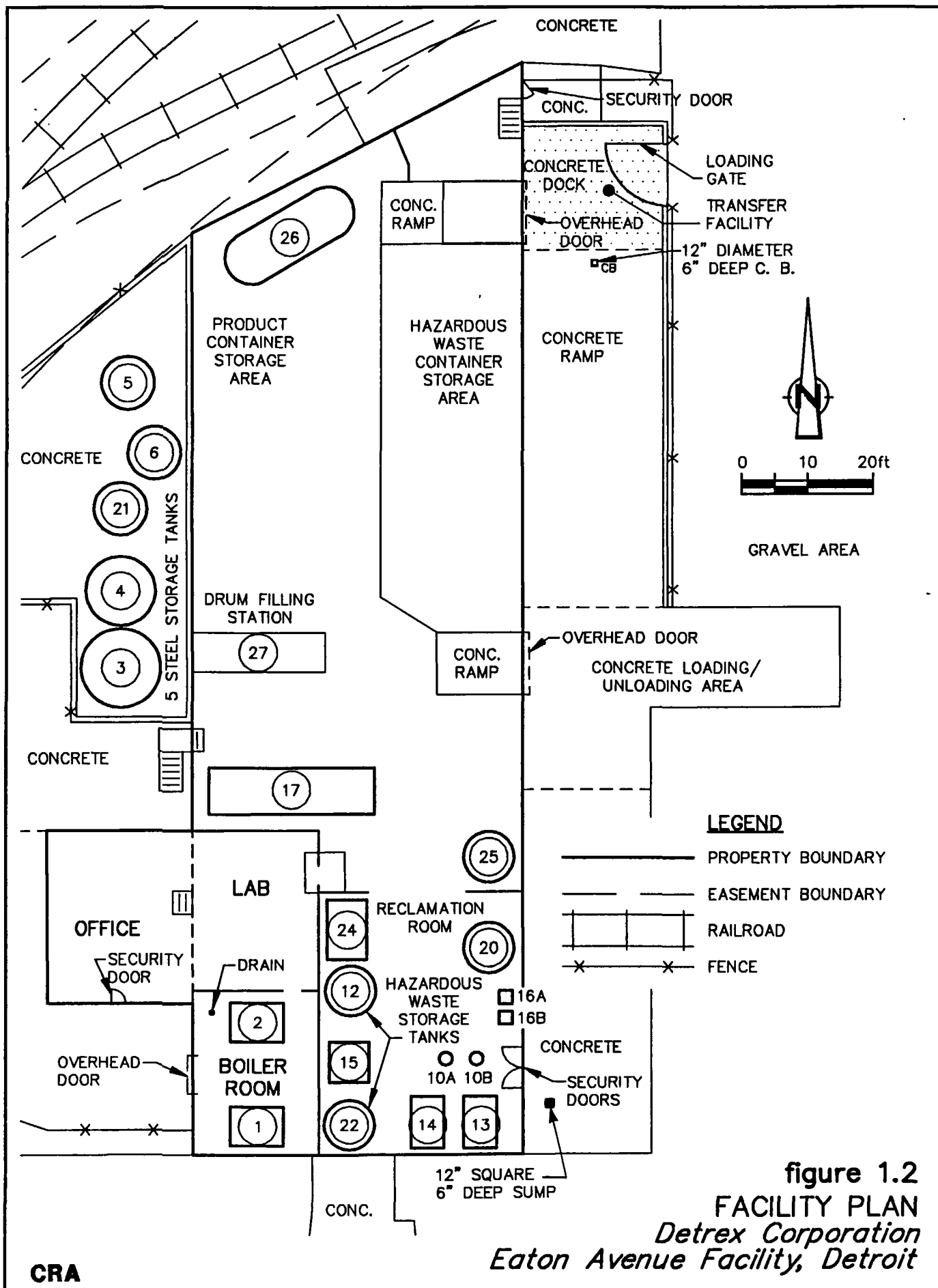
1.0 INTRODUCTION

In April, 1989, Conestoga-Rovers and Associates (CRA), on behalf of Detrex Corporation (Detrex), conducted a hydrogeological investigation for the facility located at 12886 Eaton Avenue in Detroit, Michigan. Figure 1.1 locates the facility and Figure 1.2 presents a facility plan.

In August, 1988, CRA submitted, on the behalf of Detrex, an Act 64 Operating License Application for the facility to the Michigan Department of Natural Resources (MDNR). In December, 1988, the MDNR completed a review of the operating license application and determined that a hydrogeologic report was necessary.

The requirements of the hydrogeologic investigation are specified in Act 64, Rule 229.9506(1) and (2). During a meeting with the MDNR on March 27, 1989, it was agreed that due to the size of the facility (approximately 1 acre), three soil borings would be adequate to define soil conditions at the facility. It was also discussed and agreed to by the MDNR that due to the hydrogeologic conditions expected at the facility (extensive clay deposits extending to depth, only one borehole would be advanced to the underlying aquifer and instrumented as a monitoring well. The other two borings would only be required to be completed to a minimum depth of 30 feet and subsequently backfilled with cement/bentonite grout. The above conditions, were in fact encountered at the facility, and during the active drilling program, communication with the MDNR (via telephone





conversations) confirmed the requirements of the hydrogeologic investigation field activities.

1.1 OBJECTIVES

The objectives of the hydrogeologic investigation were as follows:

1. identify the uppermost aquifer beneath the facility property; and
2. define soil and groundwater conditions beneath the facility which includes the geotechnical and hydraulic properties of the subsurface geology.

This report presents all pertinent information required under Act 64, Rule 299.9506(1) and discusses the field activities and results of the hydrogeological investigation pursuant to Act 64, Rule 299.9506(2).

2.0 FIELD ACTIVITIES

During the week of April 3, 1989, CRA conducted a hydrogeologic investigation. The investigation involved the installation of one monitoring well and two soil borings to characterize the geology and hydrogeology at the facility. Drilling was performed by McDowell and Associates, Ferndale, Michigan using a CME 55 drill rig.

The following sections of this report describe the field activities conducted during the investigation. In general, all field activities were done in accordance with CRA's Work Plan dated March 1989.

2.1 MONITORING WELL INSTALLATION

One monitoring well (BH-MW1-89) was installed east of the building to define the uppermost aquifer and groundwater elevation. Figure 1.2 locates the monitoring well.

The borehole was advanced using 4 1/4 inch I.D. hollow stem augers to a depth of 60 feet below the ground surface. At this depth, augering became inefficient due to the clay rich sediment. The drilling method was then switched to mud rotary using a 3 7/8 inch tricone drilling bit.

Continuous soil samples were collected for subsequent geotechnical analysis from ground surface to 30 feet below grade with precleaned, 2-inch diameter stainless steel split spoons. Soil samples were then collected at five foot intervals until the uppermost aquifer was encountered at a depth of 99 feet below the ground surface. Two shelly tubes were also collected from this borehole for vertical permeability analysis at depths of 30 to 32 feet and 54 to 56 feet below grade. Perched groundwater was not encountered during drilling.

Upon completion of the borehole, a monitoring well was installed approximately 12 feet into the sand aquifer at a depth of 111 feet below the ground surface. The well was constructed of 10 feet, 0.010 inch slotted, schedule 80, 2-inch diameter flush threaded PVC, joined to 2-inch diameter schedule 80 flush threaded PVC riser pipe. A sand pack of quartz sand (No. 20) was placed around and 20 feet above the well screen. A 5-foot bentonite pellet seal was placed over the sand pack. The remaining annulus was tremie grouted to surface with a bentonite/cement grout. The well was completed below grade with a lockable cap and a flush mounted protective casing

A stratigraphic and instrumentation log for BH-MW1-89 is provided in Appendix A.

2.2 SOIL BORING INVESTIGATION

Two soil borings (BH2-89 and BH3-89) were performed south and west of the building, respectively. Figure 1.2 locates the borings. The boreholes were advanced using 4 1/4-inch hollow stem augers. Continuous soil samples were collected using precleaned stainless steel spoons to a depth of 30 feet below grade with one additional soil sample collected at 35 feet below grade. During the soil boring investigation perched groundwater was not encountered. Selected soil samples were submitted for moisture content, grain size distribution and Atterberg limits analysis.

Upon completion of the boreholes, the boreholes were backfilled to ground surface with bentonite/cement grout.

Stratigraphic logs for BH2-89 and BH3-89 are presented in Appendix A.

2.3 GEOTECHNICAL ANALYSIS

Soil samples were collected for moisture content, grain size distribution, Atterberg limits and permeability analysis. The analyses were performed by McDowell and Associates.

Table 2.1 lists the samples collected, their location, depth and analyses performed. The resulting lab reports are presented in Appendix B.

2.4 EQUIPMENT CLEANING

Prior to drilling and between boreholes the drill rig, augers, drill rods and associated equipment were cleaned with a high pressure-low volume hot water wash.

The split spoons and monitoring well screen and riser pipe were cleaned further with an isopropanol and distilled water rinse.

2.5 WELL DEVELOPMENT

Monitoring well BH-MW1-89 was developed and stabilized using a "Geoguard" oil-less air lift bladder pump. Approximately 58 gallons were removed in an attempt to bring the well to a silt free condition. After 52 gallons were removed, the evacuated water was measured for pH and conductivity until three consecutive and consistent readings were obtained.

A well development summary is presented on Table 2.2.

TABLE 2.1

**GEOTECHNICAL SOIL SAMPLING SUMMARY
EATON AVENUE FACILITY, DETROIT, MICHIGAN**

<i>Location</i>	<i>Depth (ft.bgs)</i>	<i>Analysis</i>
BH-MW1-89	2-4	Moisture Content
	6-8	Moisture Content
	10-12	Moisture Content
	14-16	Moisture Content
	18-20	Moisture Content
	22-24	Moisture Content
	26-28	Moisture Content
	30-32	Permeability, Grain-Size Distribution, Atterburg Limits and Moisture Content
	39-41	Moisture Content
	49-51	Moisture Content
	54-56	Permeability, Grain-Size Distribution, Atterburg Limits and Moisture Content
	59-61	Moisture Content
	69-71	Moisture Content
	79-81	Moisture Content
	89-91	Moisture Content
	99-101	Moisture Content
	109-111	Grain-Size Distribution
BH2-89	2-4	Moisture Content; Grain-Size Distribution
	6-8	Moisture Content
	10-12	Moisture Content
	14-16	Moisture Content
	18-20	Moisture Content
	22-24	Moisture Content; Atterberg Limits
	26-28	Moisture Content
	34-36	Moisture Content; Grain-Size Distribution
	22-24	Moisture Content; Atterberg Limits
	26-28	Moisture Content
	34-36	Moisture Content; Grain-Size
BH3-89	2-4	Moisture Content
	6-8	Moisture Content
	10-12	Moisture Content
	14-16	Moisture Content
	18-20	Moisture Content
	22-24	Moisture Content; Atterberg Limits
	26-28	Moisture Content
	34-36	Moisture Content; Grain-Size Distribution

Notes:

Moisture Content according to ASTM D 422-63

Permeability according to ASTM D2434-68

Grain-Size Distribution according to ASTM D422-63

Atterberg Limits according to ASTM D423-66 and ASTM D424-59

TABLE 2.2**WELL DEVELOPMENT SUMMARY
EATON AVENUE FACILITY, DETROIT, MICHIGAN**

<i>Well</i>	<i>Gallons Removed</i>	<i>pH</i>	<i>Conductivity (μhmos)</i>	<i>Clarity</i>
BH-MW1	52	9.4	600	silty
	53	9.1	500	silty
	55	9.0	500	silty
	56	8.9	500	silty
	57	8.9	500	cloudy
	58	8.9	500	slightly cloudy

2.6 HYDRAULIC RESPONSE TESTING

After well development, a single well response test was performed on BH-MW1-89 to determine hydraulic conductivity of the aquifer at the well screen. A falling head response test was performed by introducing a precleaned (isopropanol and distilled water rinse) PVC rod into the well. Water level response was measured using a electric water level tape.

The data were analyzed by the method described in Hvorslev, 1951. The data and subsequent graph are presented in Appendix C.

2.7 GROUND SURVEY

Upon completion of the hydrogeologic investigation the monitoring well and two boreholes were surveyed by Warner, Cantrell and Padmos, Inc. of Farmington Hills, Michigan on April 10, 1989. Ground elevations and top of well casing elevation were measured and corrected to U.S.G.S. datum. The U.S.G.S. datum elevations are presented on the stratigraphic and instrumentation logs.

3.0 **RESULTS**

3.1 **GEOLOGY**

The Detrex facility is located in a area of low topographic relief which is defined as a lacustrine plain deposit. The facility appears to be within the lacustrine plain based on the grain size distribution of the subsurface sediments (Appendix B).

The facility is underlain with approximately 100 feet of lacustrine silty clay/clayey silt. The lacustrine sediment can be described as brown to gray, hard to stiff silty-clay with little sand and a trace of gravel. The upper four feet of sediment is poorly graded sand/silty sand fill.

Table 3.1 presents the moisture content of samples collected from BH-MW1-89, BH2-89 and BH3-89. The moisture content of 31 sediment samples ranges from 27% to 4% with a mean of 15%.

Four lacustrine sediment samples were analyzed to determine the Liquid and Plastic Limits, and Plasticity Index. The results are presented on Table 3.2. Based on the results of the Atterberg limits test, the lacustrine sediment is classified as an inorganic silty clay to clayey silt with slight to low plasticity.

TABLE 3.1**MOISTURE CONTENT SUMMARY
EATON AVENUE FACILITY, DETROIT, MICHIGAN**

<i>Location</i>	<i>Depth (ft. bgs.)</i>	<i>Moisture %</i>
BH-MW1	2-4	27.0
	6-8	14.0
	10-12	13.0
	14-16	14.0
	18-20	14.0
	22-24	15.0
	26-28	15
	30-32	12
	39-41	13
	49-51	15
	54-56	10
	59-61	23
	69-71	12
	79-81	14
	89-91	4
BH2	99-101	13
	109-111	12
	2-4	16
	6-8	14
	10-12	13
	14-16	14
	18-20	14
	22-24	14
BH3	26-28	15
	34-36	15
	2-4	17
	6-8	12
	10-12	13
	14-16	13
	18-20	14
	22-24	13
	26-28	12
	34-36	12

TABLE 3.2**ATTERBERG LIMITS SUMMARY
EATON AVENUE FACILITY, DETROIT, MICHIGAN**

<i>Location</i>	<i>Depth (ft. bgs)</i>	<i>Liquid Limit</i>	<i>Plastic Limit</i>	<i>Plasticity Index</i>
BH-MW1	30-22	23.2	14.8	8.4
MW1	54-56	23.4	14.6	8.8
BH2	22-24	23.5	12.7	10.8
BH3	22-24	24.0	12.8	11.2

The lacustrine sediment is underlain by a glacio-fluvial deposit of poorly graded sand/silty sand of an undetermined thickness. The sand has a moisture content of 12% to 13% (Table 3.1). Atterberg limits were not performed on the sand sediment.

3.2 HYDROGEOLOGY

The uppermost aquifer encountered beneath the facility is the unconsolidated sand aquifer which was encountered at an elevation of approximately 557 feet AMSL. The sand aquifer is classified as a confined aquifer with the lacustrine sediment acting as the confining layer. The groundwater potentiometric surface is at an elevation of approximately 605.18-feet AMSL. Therefore, the potentiometric surface of the sand aquifer is approximately 47-feet higher than the clay/sand boundary.

The hydraulic conductivity of the sand aquifer at the well screen was determined, by the single well response test, to be approximately 1×10^{-3} cm/sec. (Appendix C).

Groundwater flow direction was not determined during this investigation since only one well was installed. However, it is reasonable to assume that the regional groundwater flow is east-southeast towards Lake St. Clair.

The vertical permeability of the lacustrine sediment was determined by a constant head permeameter test. Two tests were performed on samples collected at depths of 30-32 and 54-56 feet below the ground surface in BH-MW1-89. Based on the these tests the vertical permeability of the lacustrine sediment ranges from 5.0×10^{-7} cm/sec to 2.6×10^{-8} cm/sec (Appendix B).

4.0 CONCLUSIONS

Based on the hydrogeologic investigation, the following conclusions are presented:

- 1) The facility is underlain with approximately 100 feet of lacustrine silty clay/clayey silt with a vertical hydraulic conductivity of less than 1×10^{-7} cm/sec.
- 2) The uppermost aquifer beneath the site is a confined, unconsolidated, sand aquifer, which was encountered at approximately 100 feet below ground surface (557 feet AMSL). The hydraulic conductivity of the uppermost aquifer is approximately 1×10^{-3} cm/sec.

Date: 05/08/89
Revision: 89-2
Attachment E-1: Appendix A

APPENDIX A

STRATIGRAPHIC AND INSTRUMENTATION LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-1)

PROJECT NAME: ~~GOLDSHIELD~~ - DETROIT
PROJECT NO.: 2471
CLIENT: DETREX CORPORATION
LOCATION: EAST SIDE OF BUILDING

HOLE DESIGNATION: BH-MW1-89
(Page 1 of 2)
DATE COMPLETED: APRIL 5, 1989
DRILLING METHOD: 4-1/4" ID HSA/
3-7/8" MR
CRA SUPERVISOR: B. SANDBERG

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE		
				NUMBER	STATE	VALUE
	GROUND SURFACE	656.3				
	REFERENCE ELEVATION (Top of Riser)	656.09				
	Dark gray sand and gravel with some clay, wet FILL	653.3		1SS	X	18
5.0	SM (SAND), fine grained, silty, trace clay, dry to moist	651.3		2SS	X	20
	CL (CLAY), little silt, trace gravel, mottled blue-brown, stiff, dry			3SS	X	20
10.0	Moist			4SS	X	41
				5SS	X	58
				6SS	X	78
15.0	Little silt, trace sand and gravel, blue, moist			7SS	X	37
				8SS	X	30
				9SS	X	23
20.0				10SS	X	23
				11SS	X	11
25.0				12SS	X	31
				13SS	X	27
30.0	Collected Shelby tube			14SS	X	25
				15SS	X	26
35.0				1ST	X	
				16SS	X	28
40.0				17SS	X	31
45.0				18SS	X	31
50.0				19SS	X	38
55.0	Collected Shelby tube			2ST	X	
60.0				20SS	X	16
65.0	CL (CLAY), trace sand and gravel, gray, stiff, moist			21SS	X	17
				22SS	X	23

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS ○

WATER FOUND ∇

STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-1)

PROJECT NAME: GOLDSHIELD - DETROIT

PROJECT NO.: 2471

CLIENT: DETREX CORPORATION

LOCATION: EAST SIDE OF BUILDING

HOLE DESIGNATION: BH-MW1-89
(Page 2 of 2)

DATE COMPLETED: APRIL 5, 1989

DRILLING METHOD: 4-1/4" ID HSA/
3-7/8" MR

CRA SUPERVISOR: B. SANDBERG

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE		
				NUMBER	STATE	VALUE
				21SS	⊗	17
70.0	CL (CLAY), gray, soft, wet		CEMENT/ BENTONITE GROUT	22SS	⊗	23
75.0			4.0" BOREHOLE	23SS	⊗	20
80.0			BENTONITE PELLET SEAL	24SS	⊗	24
85.0				25SS	⊗	24
90.0			SAND PACK	26SS	⊗	14
95.0				27SS	⊗	14
100.0	6" gravel seam @ 558.3' AMSL	557.3		28SS	⊗	83
105.0	SM (SAND), fine to very fine grained, silty, trace gravel, gray, dense, wet					
110.0	END OF HOLE @ 111.0 FT. BGS	545.3	WELL SCREEN	29SS	⊗	100
115.0	NOTES: 1. Borehole advanced to 596.3 ft. AMSL using 4-1/4" ID hollow stem auger. 2. Drilling was advanced beyond this depth using 3-7/8" dia. Tricone bit.		SCREEN DETAILS: Screened Interval: 555.3' to 545.3' AMSL Length - 10' Diameter - 2" Slot # - 10 Material - PVC Sand Pack Interval: 575.3' to 545.3' AMSL Material - Sand			
120.0						
125.0						
130.0						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS



WATER FOUND



STATIC WATER LEVEL







STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-2)

PROJECT NAME: GOLDSHIELD - DETROIT
PROJECT NO.: 2471
CLIENT: DETREX CORPORATION
LOCATION: SOUTH SIDE OF BUILDING

HOLE DESIGNATION: BH2-89
DATE COMPLETED: APRIL 5, 1989
DRILLING METHOD: 4-1/4" ID HSA
CRA SUPERVISOR: B. SANDBERG

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE		
				NUMBER	STATE	VALUE
	GROUND SURFACE	654.6				
3.0	Sand, clay and gravel mixture, discolored, no odor	650.6		1SS	X	14
				2SS	X	8
6.0	CL (CLAY), some silt, little gravel, mottled texture, brown-blue, stiff, damp Brown			3SS	X	36
				4SS	X	59
9.0				5SS	X	64
				6SS	X	67
12.0				7SS	X	44
				8SS	X	33
15.0	CL (CLAY), silty, trace gravel, gray-blue, moist, stiff			9SS	X	33
				10SS	X	35
18.0				11SS	X	31
				12SS	X	42
21.0				13SS	X	27
				14SS	X	29
24.0				15SS	X	29
27.0						
30.0						
33.0	Sandy					
36.0	END OF HOLE • 36.0 FT. BGS	618.6		16SS	X	23
39.0						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS  WATER FOUND  STATIC WATER LEVEL 

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-3)

PROJECT NAME: GOLDSHIELD - DETROIT

HOLE DESIGNATION: BH3-89

PROJECT NO.: 2471


DATE COMPLETED: APRIL 6, 1989

CLIENT: DETREX CORPORATION

DRILLING METHOD: 4 1/4" ID HSA

LOCATION: WEST SIDE OF BUILDING

CRA SUPERVISOR: B. SANDBERG

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE		
				NUMBER	STATE	VALUE
	GROUND SURFACE	655.5				
3.0	Six inch concrete driveway Sand, gravel, brick, discolored, organic odor, wet, FILL Sand and gravel mixture, black, wet		 <p>8.0" BOREHOLE</p> <p>CEMENT/ BENTONITE GROUT</p>	1SS 2SS		
6.0	CL (CLAY), some silt, trace sand and gravel, brown, moist	651.0		3SS		27
				4SS		54
9.0				5SS		65
12.0	Blue clay			6SS		82
				7SS		53
15.0				8SS		42
18.0				9SS		30
				10SS		37
21.0	Some silt, little sand			11SS		27
				12SS		41
24.0				13SS		30
27.0				14SS		33
30.0				15SS		33
33.0						
36.0	END OF HOLE • 36.0 FT. BGS	619.5		16SS		35
39.0						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS



WATER FOUND



STATIC WATER LEVEL



Date: 05/08/89
Revision: 89-2
Attachment E-1: Appendix B

APPENDIX B

LABORATORY DATA REPORTS

McDOWELL & ASSOCIATES

21355 Hatcher Avenue
Ferndale, Michigan 48220

Phone: (313) 399-2066
Fax: (313) 399-2157

Rec'd CRA
MAY 2 1989

April 24, 1989

Conestoga-Rovers & Associates, Ltd.
651 Colby Drive Waterloo
Ontario, Canada N2V1C2

Job No. 89-171

Attention: Mr. Steve Crossman

Subject: Laboratory Test Data
Goldshield Solvents
Detroit, Michigan

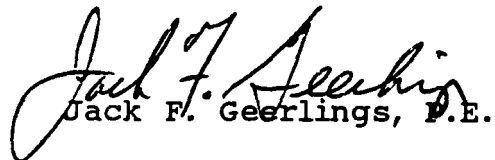
Gentlemen:

In accordance with your request we have performed laboratory tests on the soil samples from the subject project. The results are shown on the attached Gradation Curves, summary sheet of Moisture Contents and summary sheet of Atterberg Limit Test Results. Permeability tests are in progress and results will be forwarded as soon as they are completed.

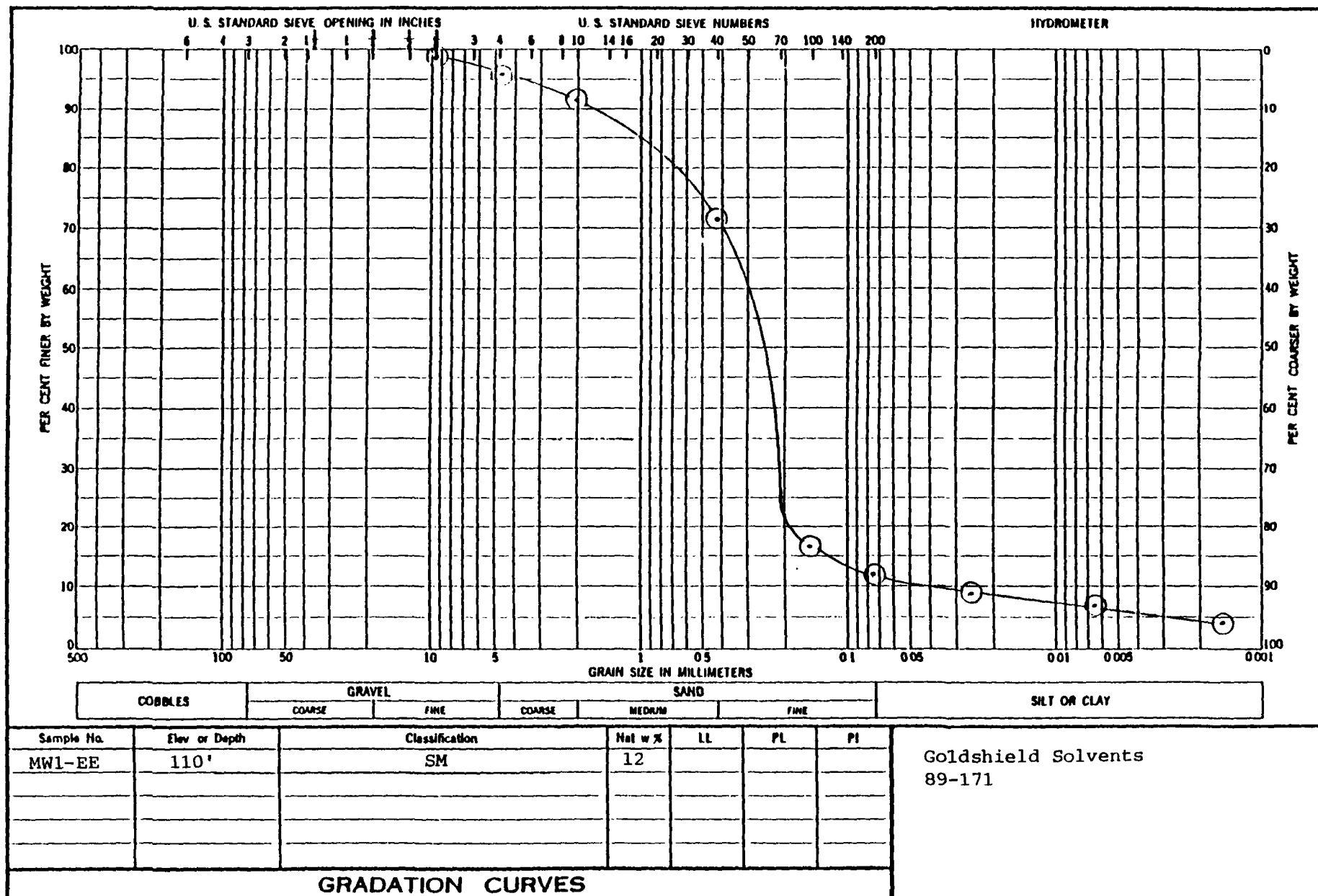
If you have any questions, or if we can be of further service, please feel free to call.

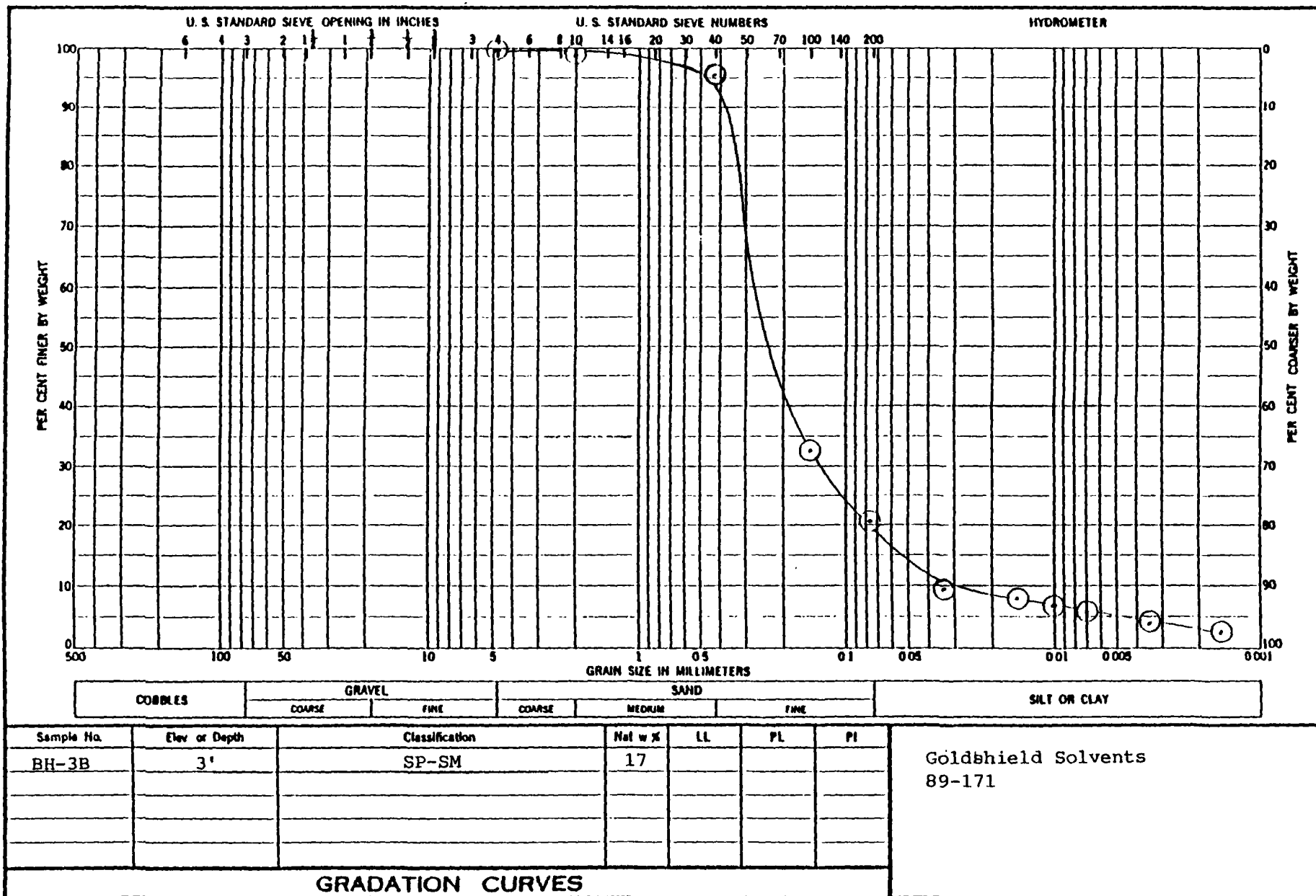
Very truly yours,

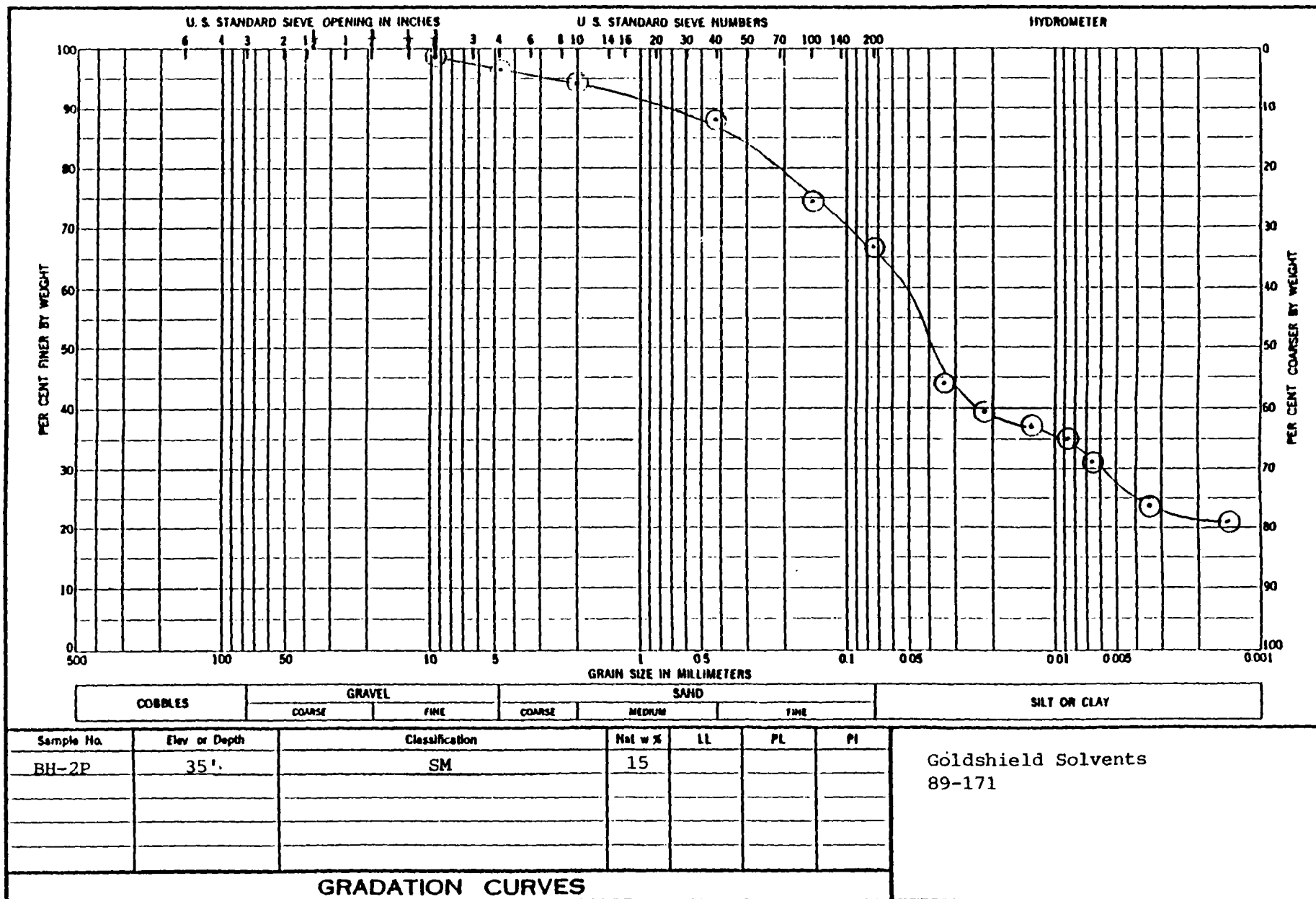
McDOWELL & ASSOCIATES

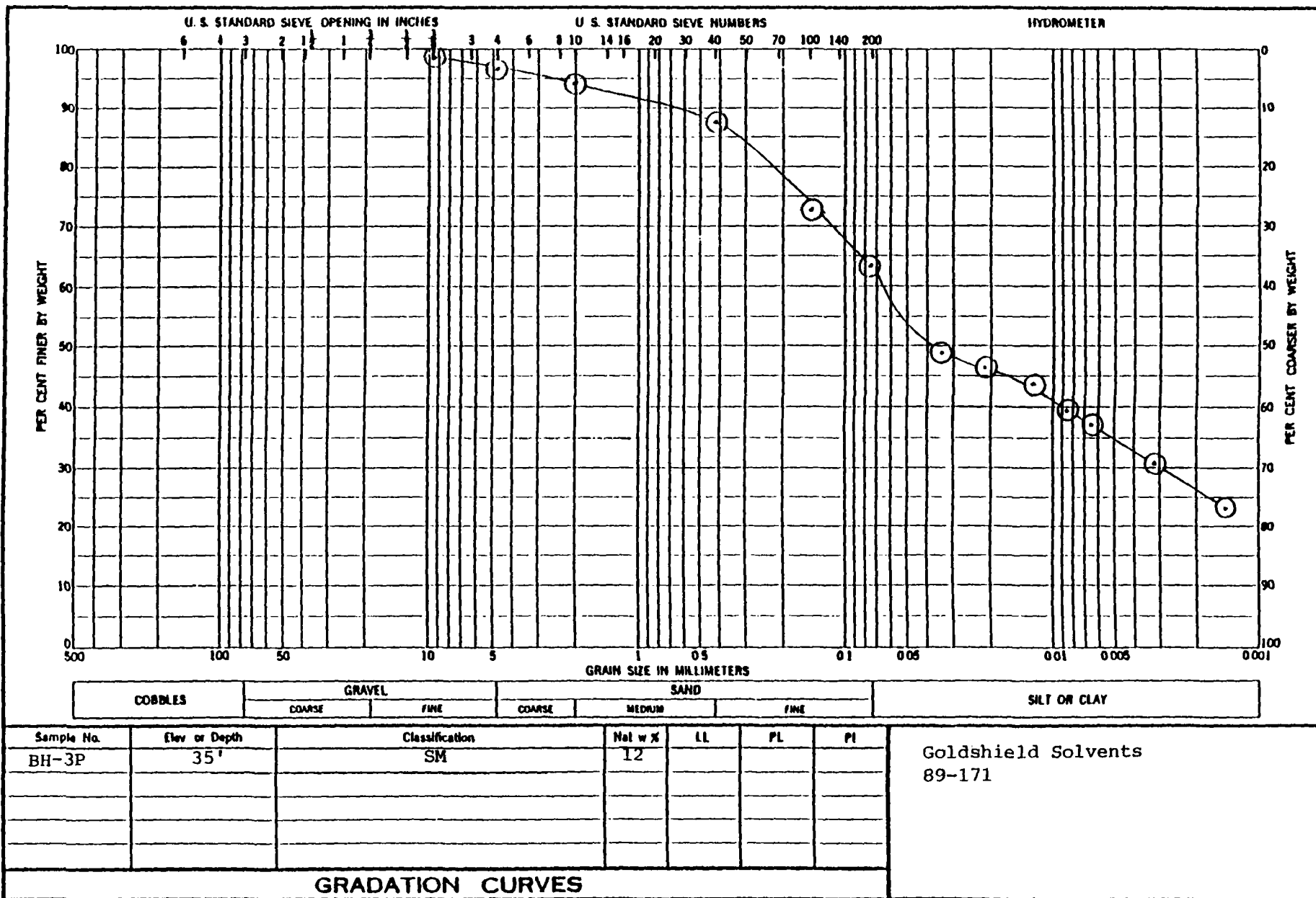

Jack F. Geerlings, P.E.

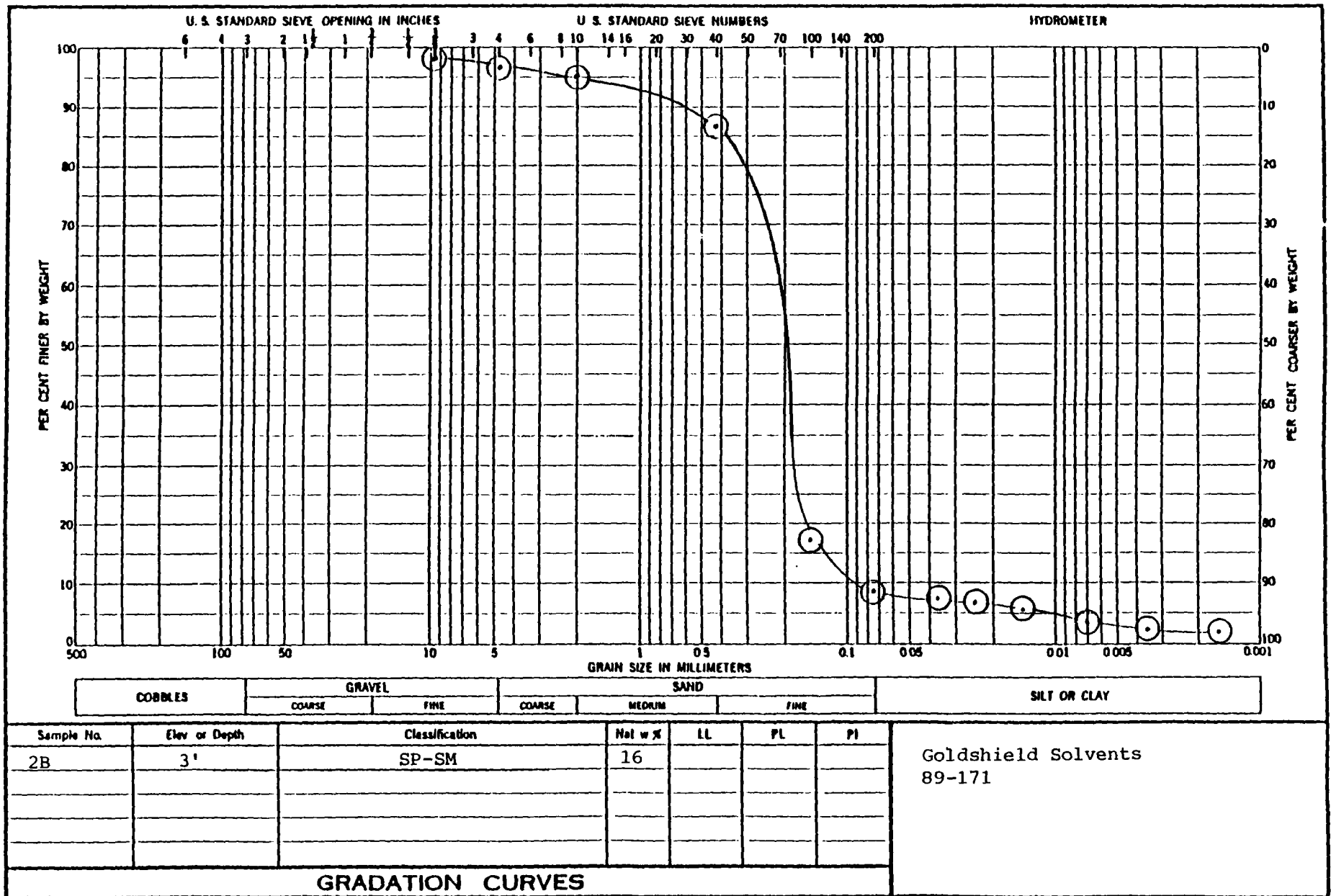
JFG:jc











MOISTURE CONTENTS

<u>Sample No.</u>	<u>Depth</u>	<u>% Moisture</u>
MW-1	B	27
	D	14
	F	13
	H	14
	J	14
	L	15
	N	15
	P	12
	R	13
	T	15
	U	10
	V	23
	X	23
	Z	24
	BB	4
	DD	13
	EE	12
BH-2	B	16
	D	14
	F	13
	H	14
	J	14
	L	14
	N	15
	P	15
BH-3	B	17
	D	12
	F	13
	H	13
	J	14
	L	13
	N	12
	P	12

JOB NO. 89-171

ATTERBERG LIMITS RESULTS

<u>BORING/SAMPLE</u>	<u>LIQUID LIMIT</u>	<u>PLASTIC LIMIT</u>	<u>PLASTICITY INDEX</u>
MW1P	23.2	14.8	8.4
MW1U	23.4	14.6	8.8
BH2L	23.5	12.7	10.8
BH3L	24.0	12.8	11.2

McDOWELL & ASSOCIATES

21355 Hatcher Avenue
Ferndale, Michigan 48220

Rec'd CRA
MAY 5 1989

Phone: (313) 399-2066
Fax: (313) 399-2157

May 4, 1989

Conestoga-Rovers & Associates, Ltd.
651 Colby Drive
Waterloo, Ontario, Canada N2V1C2

Job No. 89-171

Attention: Mr. Steve Crossman

Subject: Water Well Record Survey and
Permeability Test Results
Goldshield Solvents
Detroit, Michigan

Gentlemen:

We have requested from the Michigan Department of Natural Resources all available well water records for the subject site area. They have only two (2) well records for the entire township T1S, R11E known as Greenfield Township. A copy of each well is attached herein for your use.

Triaxial Permeability Test Results are listed on the table below:

1P	5.0×10^{-7} cm/sec
1C	2.6×10^{-8} cm/sec

If you have any questions, or if we can be of any further service, please feel free to call.

Very truly yours,

McDOWELL & ASSOCIATES



Daniel A. Kaniarz, P.E.

DAK:jc

WAYNE COUNTY
INDUSTRIAL WATER SUPPLY

November 6, 1947

Mr. Andrew Mozola
5086 Talbot Avenue
Detroit 12, Michigan

Dear Andy:

I was sorry to miss you in Detroit, November 1. I was not armed with your telephone number and could not find the name in the directory or I would have telephoned you in the afternoon.

The well being drilled at the Parke, Davis and Company Warehouse, 3220 Bellevue Avenue, just south of Mack Avenue, is for cooling water, and they require 400 GPM. Their log so far is as follows:

Blue clay	14'	-	120'
Hardpan	123'	-	146'
Quicksand, almost dry	146'	-	151'
Hardpan	151'	-	156'
Water sand	156'	-	157'
Gray Traverse sand rock	157'	-	158'
Gray Traverse sand rock	158'	-	200'

This log appears very similar to the log of the well at the Stroh's Brewery on Gratiot Avenue, of which you have a copy. They do not care about the quality of the water, and I advised that they go down to the Sylvania at approximately 700 feet. They intend to case off the Monroe black water, and this will afford a sample of uncontaminated Sylvania water, which will be quite an addition to our knowledge. If you can drop in on them occasionally during the drilling, we shall appreciate it.

Very truly yours

GEOLOGICAL SURVEY DIVISION
John G. Bulison
Hydrogeologist

JGR:ans

Highland Park (Wayne County)

Ford Motor Company Well

Location: T. 1 S., R. 11 E., 48 feet south of north property line and 6 feet west of West Brush Street-line of Ford Motor Company, Woodward Avenue, Highland Park.

Elevation: About 633 feet above sea level.

Record by: R. A. Smith from samples furnished by W. H. Smith of Ford Motor Company

	Thickness (Feet)	Depth (Feet)
No record	230	230
Devonian:		
Traverse:		
Gray, soft, shale calcareous and fossiliferous between 270 and 280 feet	70	300
Hard gray limestone, some gray shale or "soapstone"	5	305
Hard gray crystalline limestone	5	310
Bell:		
Soft, calcareous, light gray shale or "soapstone", very smooth grained	40	350
Dundee:		
Hard, light gray, crystalline limestone. Sample 350 to 355 badly rusted	10	360
Hard, white to light gray and buff crystalline limestone with dark brown and black streaks and laminae of bituminous matter. Two to three per cent of pure white sand, grains very rounded in samples 470 to 475 feet.	115	475
Very hard, crystalline, light gray pyritic and sandy limestone. Many very small crystals of pyrite and 5% or more of pure white quartz sand with rounded grains of uniform size similar to Sylvania	5	480
Buff bituminous and white to light grayish buff limestone. Buff limestone is very sandy appearing, but contains very little sand. Crinoidal from 485 to 490 feet	10	490
Detroit River:		
Chiefly white, earthy looking dolomite, with fine laminae of pyritic and black bituminous matter. A little buff bituminous limestone apparently from Dundee above	5	495
Buff bituminous limestone and native sulphur	10	505
White, light gray, and buff bituminous limestone and native sulphur	5	510
Light gray dolomite	5	515
Light gray to buff dolomite	5	520
Light grayish buff to dark buff dolomite and dolomitic limestone	10	530
White and buff dolomite and dolomitic limestone	5	535
Hard buff granular dolomite and dolomitic limestone	5	540

(over)

Page 2-Highland Park (Wayne County)
Ford Motor Company Well

	Thickness (Feet)	Depth (Feet)
Detroit River, continued		
Hard, light buff dolomite	15	555
Buff bituminous dolomite	15	170
White and light buff dolomite	5	575
Light buff and buff dolomite, and some black shale	5	580
Light buff dolomite, pure white anhydrite and gypsum	5	585
Light buff to buff dolomite and much pure white anhydrite	15	600
Dark buff dolomite	5	605
Light buff dolomite	5	610
Chiefly white dolomite, some light buff	10	620
Light gray, earthy looking dolomite	5	625
Buff crystalline dolomite	5	630
Light buff crystalline dolomite, sandy-about 5% of pure white quartz sand, grains rounded	15	645
White and very light buff dense grained dolomite	10	655
Light buff dolomite	5	660
Buff gray argillaceous dolomite with streaks and laminae of black bituminous shale	5	665
Light buff and white finely crystalline dolomite	15	680
Light buff dolomite and pure white anhydrite-25% anhydrite	10	690
Light grayish buff fine grained dolomite with black bituminous laminae	5	695
Very light gray grayish buff, and white dolomite	5	700
Buff dolomite with black bituminous streaks and soft white chalky limestone	5	705
Dark grayish buff dolomitic limestone	5	710
Grayish buff limestone. The limestone from about 705 to 730 feet may be the Anderson beds	5	715
Buff limestone with much white chalky limestone	5	720
Light buff limestone	5	725
Light buff to buff limestone and dark buff bituminous dolomite	5	730
Dark gray dolomite and some light buff limestone	5	735
Sample from 735 to 745 missing-very probably dolomite	10	745
Grayish buff dolomite and considerable shaly white limestone	5	750
Grayish buff dolomite and dolomitic limestone	25	775
Buff gray dolomite	10	785
Sylvania:		
Pure white sandstone of uniform sized grains of white or colorless quartz. A little mixture of buff dolomite from above	5	790
Pure white sandstone-sample badly rusted from fragments of the drill	30	820
White dolomitic sandstone. 80% pure white quartz sand	5	825
Pure white sandstone	25	850
Pure white sandstone and gray sandy dolomite	5	855
Gray sandy dolomite-pure white rounded sand grains embedded in a dolomitic matrix	5	860

Date: 05/08/89

Revision: 89-2

Attachment E-1: Appendix C

APPENDIX C

WELL RESPONSE TEST DATA

SINGLE WELL RESPONSE TEST

WELL NO: MW-1 DATE: 04-06-89
 JOB #: 2471 SLUG LT: 5 FT
 CLIENT: GOLD SHIELD,DET. SCREEN LT: 10 FT
 SWL: 50.91 b. T.O.C. SCREEN DIA: 0.17 FT

FALLING

TIME (SEC)	W/L	dH	LOG dH
0.00	50.91	1.00	0.00
12.00	50.00	0.73	-0.14
44.00	50.40	0.41	-0.39
88.00	50.60	0.25	-0.61
133.00	50.70	0.17	-0.77
200.00	50.80	0.09	-1.06
298.00	50.85	0.05	-1.32
420.00	50.90	0.01	-2.10

Regression Output:FALLING

Constant	0.00
Std Err of Y Est	0.14
Squared	0.95
No. of Observations	6.00
Degrees of Freedom	5.00

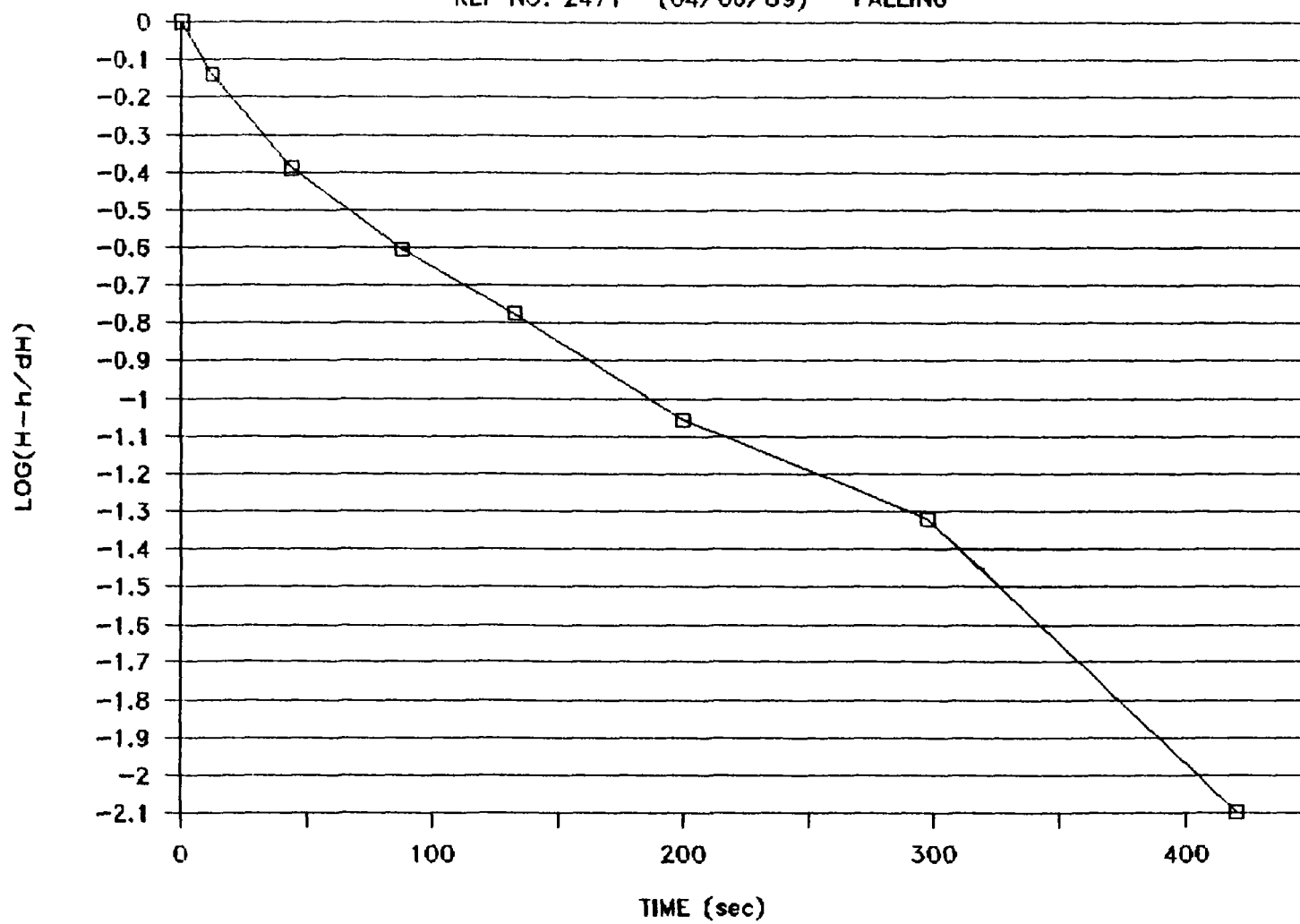
X Coefficient(s)	-0.00
Std Err of Coef.	0.00

HVORSLEV LAG TIME = 86.60

K= 9.94E-04 cm/sec

SINGLE WELL RESPONSE TEST FOR WELL MW-1

REF NO. 2471 (04/06/89) FALLING

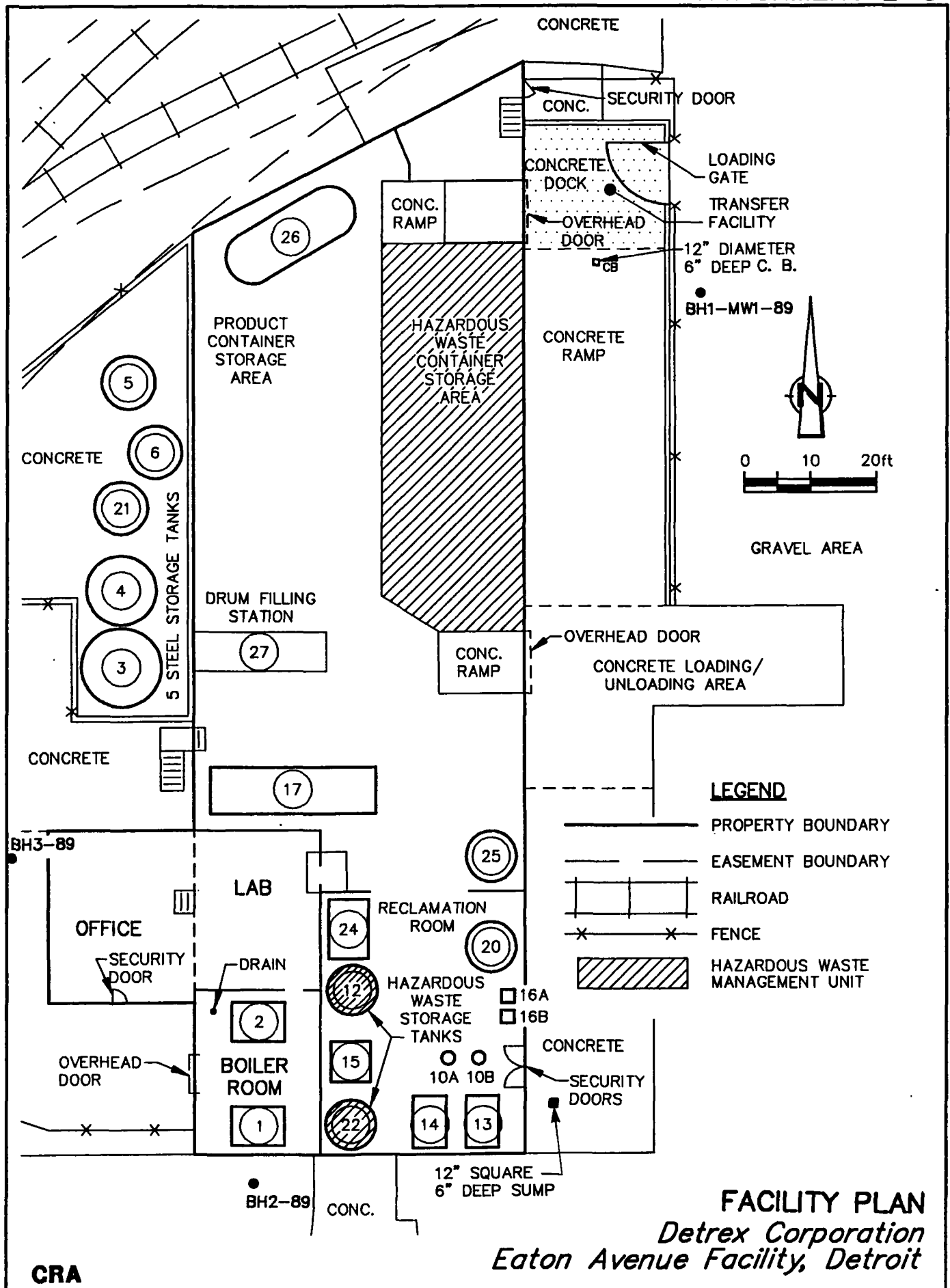


ATTACHMENT E-2

TOPOGRAPHIC MAP

ATTACHMENT E-3

FACILITY PLAN



CRA

2471-04/06/91-1-0

LIST OF PROCESS EQUIPMENT

<i>I.D. No.</i>	<i>Equipment Name</i>	<i>Description</i>
1.	Generator	Clayton Model E-100 Steam Generator. Unit burns natural gas to produce steam at the rate of 3450 lbs./hr. at 100 psig.
2.	Air Compressor	
3.	20,000 gal. Product Tank	20,000 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
4.	10,000 gal. Product Tank	16,000 gallon carbon steel storage tank for storage of Trichloroethylene
5.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Perchloroethylene.
6.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Trichloroethylene
10 A/B	2 - 600 gal. Receiver Tanks	Used for receiving product from Detrex stills. (Operated at atm. pressure).
12.	2,300 gal. Hazardous Waste tank storage tank	2,300 gallon carbon steel storage tank used for storage of F001 or F002 material prior to processing
13.	350 gal. Detrex Still	Detrex Model S-350. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
14.	350 gal. Detrex Still	Detrex Model S-600. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
15.	DCI Still	DCI Model Dyna-1-100 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 100 gallons per hour.
16 A/B	Drying Columns	Detrex Dual Column Drier. Used to remove water from recovered product (solvent) via adsorption.

LIST OF PROCESS EQUIPMENT

<i>I.D. No.</i>	<i>Equipment Name</i>	<i>Description</i>
17.	5,000 gal. Still Bottom Tank	5,000 gallon carbon steel storage tank. Used for temporary storage of still bottoms from recovery of chlorinated solvents (F002 material).
20.	2,500 gal. Holding Tank	2,500 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
21.	4,500 gal. 1,1,1 Trichloroethane	4,500 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
22.	4,000 gal. Hazardous Waste Storage Tank	4,000 gallon carbon steel storage tank used for temporary storage of F001 or F002 material prior to being processed by Detrex stills.
24.	DCI Still	DCI Model Dyna-1-500 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 500 gallons per hour.
25.	3,000 gal. Holding Tank	3,000 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
26	SVRM - Carbon Absorption Unit	
27.	Drum Filling Station	Product Drumming Station. Used for filling 55-gallon drums with product. Unit can fill approximately 30 drums per hour and is operated as necessary.

Date: 06/24/91
Revision: 91-1
Page: F-1

SECTION F

PROCEDURES TO PREVENT HAZARDS

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SECTION F

PROCEDURES TO PREVENT HAZARDS

This section of the operating license application provides a description of the procedures implemented at the Detrex Corporation facility in Detroit, Michigan to prevent the possibility of a hazard from occurring.

This information is provided pursuant to Michigan Act 64 Rule 299.9504(1)(c) which incorporates 40 CFR 270.14(b)(4),(5),(6),(8), and (9) by reference. The applicable section(s) of the Federal Regulations (40 CFR) is referenced as appropriate.

F-1 FACILITY SECURITY [40 CFR §264.14/§270.14(b)(4)]

**F-1a Security Procedures and Equipment
[40 CFR §270.14(b)(4), §264.14]**

F-1a(1) 24-Hour Surveillance System [40 CFR 264.14(b)(1)]

A 24-hour electronic surveillance system is provided at the Detrex facility. Notwithstanding this, other security procedures, described below, are provided as an addition.

F-1a(2)(a) Barrier [40 CFR §264.14(b)(2)(i)]

The entire hazardous waste container and tank storage areas and the recycling process operation are located within an enclosed building. This building is supplied with security doors which are locked at all times when the facility is unattended. An 8-foot high, chain-link fence topped with razor wire surrounds much of the facility and in conjunction with the building itself prevents access by unauthorized people to all areas. Security precautions are illustrated in Attachment F-1.

F-1a(2)(b) Means to Control Entry [40 CFR §264.14(b)(2)(ii)]

Entry to the entire facility is prevented to all except authorized individuals. Entry is controlled by the existing fencing and security doors which remain locked at all times when the facility is unattended. Access is obtained through the security gate and doors by the use of a key or by the assistance of someone already inside of the facility.

During working hours, the two most southern doors (see Attachment F-1) along the east side of the building may be open. Employee(s) are always present in the reclamation room/warehouse when the doors are open. The central door is also equipped with a motion-detector alarm that is activated should unauthorized individuals attempt to enter the facility when the door is open.

F-1a(3) Warning Signs [40 CFR §264.14(c)]

Warning signs are posted on the outside wall of the building wherever an access door is located. The signs are legible from 25 feet and have one-inch high block letters with the following wording:

"Caution-Hazardous Area - Unauthorized Persons Keep Out."

F-1b Waiver [40 CFR §264.14(a)]

Detrex Corporation does not request a waiver from the requirements of 40 CFR §264.14(a)(1) and (2).

F-2 INSPECTION SCHEDULE
[40 CFR §270.14(b)(5), §264.15, 264.174, 264.195]

F-2a General Inspection Requirements
[40 CFR §270.14(b)(5), §264.15(a) and (b), §264.33]

Detrex Corporation conducts regular inspections of the hazardous waste container and tank storage areas for leaking containers/tanks and for deterioration of containers/tanks and related process lines. Inspections are also conducted for deterioration of the secondary containment system that could cause or lead to the release of hazardous waste constituents to the environment or threaten human health. Additionally, after every waste shipment is received at the facility, the transport vehicle and the loading/unloading area are inspected.

The hazardous waste container and tank storage areas are contained within a single 'warehouse' type building. This allows an almost continual check by on-site staff and rapid detection and response to any problems.

Detrex Corporation also conducts regular inspections of the monitoring equipment, safety equipment, security devices and operating and structural equipment to ensure that no danger of a release of hazardous waste constituents or threats to human health exist.

Attachment F-3 presents typical hazardous waste inspection forms used in the general inspection procedures at the facility. These forms indicate typical problems that might be encountered as well as provisions for the reporting of any remedial actions that may be undertaken.

F-2a(1) Types of Problems [40 CFR §264.15(b)(3)]

Attachment F-2 presents the typical schedule for inspecting security, emergency equipment and the hazardous waste container and tank storage areas. Types of problems normally encountered with each inspection item are included. Copies of the inspection schedule are kept on file at the facility at all times.

F-2a(2) Frequency of Inspection [40 CFR §264.15(b)(4)]

Attachment F-2 also includes the frequency of inspection for each item.

F-2a(3) Remedial Action [40 CFR §264.15(c)]

Inspections may reveal problems of three types. The first type of problem involves the need for non-emergency maintenance. In this situation, qualified personnel will take the necessary actions as soon as possible to preclude further damage and reduce the potential for emergency repairs. The inspector will note in the inspections log when such action should be taken and verify the status at the next regularly scheduled inspection.

The second type of problem involves a non-emergency release of hazardous waste that is discovered during inspection. In this situation, appropriate remedial action will be taken immediately and documented in the inspection log. At a minimum, daily inspections will be made until the remedial action is completed.

The third type of problem involves the discovery of a release or the potential for the release of hazardous constituents to the environment in sufficient quantities to constitute an emergency. If this occurs, the Contingency Plan (included as Section G of this operating license application) will be implemented. The Contingency Plan provides a detailed description of the remedial action appropriate for this situation.

F-2a(4) Inspection Log [40 CFR §264.15(d)]

Provided in Attachment F-3 are typical daily, weekly and transport vehicle inspection records. These are completed by the inspector at the conclusion of each routine inspection. Each inspection record is kept on file in an inspection log for a minimum of three years.

**F-3 PREPAREDNESS AND PREVENTION [40 CFR §270.14(b)(6),
40 CFR §264 Subpart C]**

The applicant does not wish to request a waiver of the preparedness and prevention requirements under 40 CFR §264 Subpart C. Requirements of this Subpart are also addressed in the contingency plan found in Section G of this application.

Detroit Fire Department (DFD) and Police Officials are familiar with the hazardous waste management operation, and with the contingency plan for the facility. A copy of the contingency plan will be kept in the office at all times.

F-3a Equipment Requirements [40 CFR §270.14(b)(6), §264.32,]

**F-3a(1) Internal and External Communications
[40 CFR §264.32(a) and (b)]**

There is a telephone located within the reclamation room/warehouse area. This telephone can be actuated as a public address (P.A.) system to warn employees of potential hazards and to alert local emergency response teams (e.g., fire, ambulance, police). In addition the emergency coordinator on site is provided with a Sound 911 Personnel Protection Signal Horn that when activated emits a loud signal that will alert employees of potential hazards.

F-3a(2) Emergency Equipment [40 CFR §264.32(c)]

Attachment F-4 to this operating license application presents the location of all emergency and safety equipment within the facility. This equipment includes:

- 1) Absorbent Material
- 2) First-Aid Kit
- 3) Safety Shower
- 4) Eye Wash Station
- 5) Self Contained Breathing Apparatus
- 6) Respirator
- 7) Fire Extinguishers
- 8) Main Electrical Disconnect

- 9) Gloves
- 10) Boots

All emergency and safety equipment is routinely inspected and tested in accordance with the inspection schedule presented in Section F-2 to ensure its proper operation in time of emergency.

F-3a(3) Water for Fire Control [40 CFR §264.32(d)]

There are two fire hydrants, serviced by an 8-inch diameter watermain, located near the facility along Eaton Avenue. The nearest is only about 25 feet south of the south end of the facility.

F-3b Aisle Space Requirement [40 CFR §264.35]

Adequate aisle space (i.e. minimum two and one-half feet) for inspection purposes is maintained in the hazardous waste container storage area. This allows detection of spill material and the unobstructed movement of personnel, fire protection equipment, and spill control equipment. In the event it is necessary, the forklift can be utilized to move drums to address specific problems such as spilled material.

F-4 PREVENTIVE PROCEDURES, STRUCTURES AND EQUIPMENT
[40 CFR §270.14(b)(8)]

F-4a Loading/Unloading Operations [40 CFR §270.14(b)(8)(i)]

Hazardous waste loading/unloading operations, associated with the container storage area, consists of internal forklift or hand drum truck movement of containers to the recycling room and the unloading of incoming containerized waste. Forklifts are equipped with a special drum handling attachment for transferring drummed waste.

The unloading of containerized hazardous wastes occurs at the middle overhead door on the east side of the building. The delivery truck backs up to the raised loading area. The containers are unloaded using a forklift with a drum handling attachment or hand drum trucks. The door of the loading area is diked with a concrete ramp to maintain secondary containment while allowing for easy movement of containers.

Bulk shipments of hazardous waste are periodically received at the facility via tanker trucks. Trucks enter from Eaton Avenue and park on the concrete pad located at the east side of the facility next to the south overhead door. Bulk waste is pumped directly into hazardous waste storage tanks from the delivery tanker truck via a system of vacuum tubing with quick release couplings installed within the facility. All pumping is conducted under procedures designed to minimize the risk of a possible spill of the hazardous waste.

All unloading operations are conducted under the supervision of Detrex personnel and the area used for unloading is inspected at the conclusion of unloading operations to ensure no spillage has occurred. In addition, the transport vehicle is inspected to ensure all wastes have been removed and no spillage has occurred during transporting or material transfer.

F-4b Run-off Control [40 CFR §270.14(b)(8)(ii)]

The hazardous waste container and tank storage areas are located within an enclosed building. This prevents accumulation of run-on waters in the hazardous waste and tank storage areas. As presented in Section B of this operating license application, surface runoff is directed away from the building structure in all areas except along a portion of the east wall. A 12-inch square, 6-inch deep sump is located within the concrete

loading/unloading area to provide runoff control. The accumulated runoff is tested in accordance with a Detroit Water and Sewerage Industrial Wastewater Discharge Permit. If the water meets the conditions of the permit, it is discharged into the municipal sanitary sewer system through a drain located in the Boiler Room. If the water fails to meet the permit requirements for direct discharge, it will be collected and containerized for off-site disposal in accordance with Federal, State and local regulations. A 12-inch diameter, 6-inch deep catchbasin is located within the Transfer Facility, however this is independent of the TSD operation and no accumulated liquids are discharged to the ground.

F-4c Water Supplies [40 CFR §270.14(b)(8)(iii)]

Groundwater contamination is prevented by eliminating the discharge of hazardous materials onto the unprotected ground. The hazardous waste container and tank storage areas are contained within an enclosed building structure provided with adequate secondary containment. Additionally, the outdoor loading/unloading area is provided with adequate secondary containment including a 24-hour 100-year rainfall event.

F-4d Equipment and Power Failure [40 CFR §270.14(b)(8)(iv)]

In the event of a power failure, plant operations will stop. The loss of power does not pose a potential threat with respect to the operation of the recycling (recovery) system.

The building alarm system is provided with an emergency back-up battery to ensure its continued operation during periods of power outage. This alarm system provides security and fire protection.

F-4e Personnel Protection Equipment [40 CFR §270.14(b)(8)(v)]

The personnel protection equipment provided at the facility is described in Section F-3a. It is further described in the Contingency Plan located in Section G of this operating license application. The proper use of the appropriate equipment is explained during personnel training procedures as described in Section H.

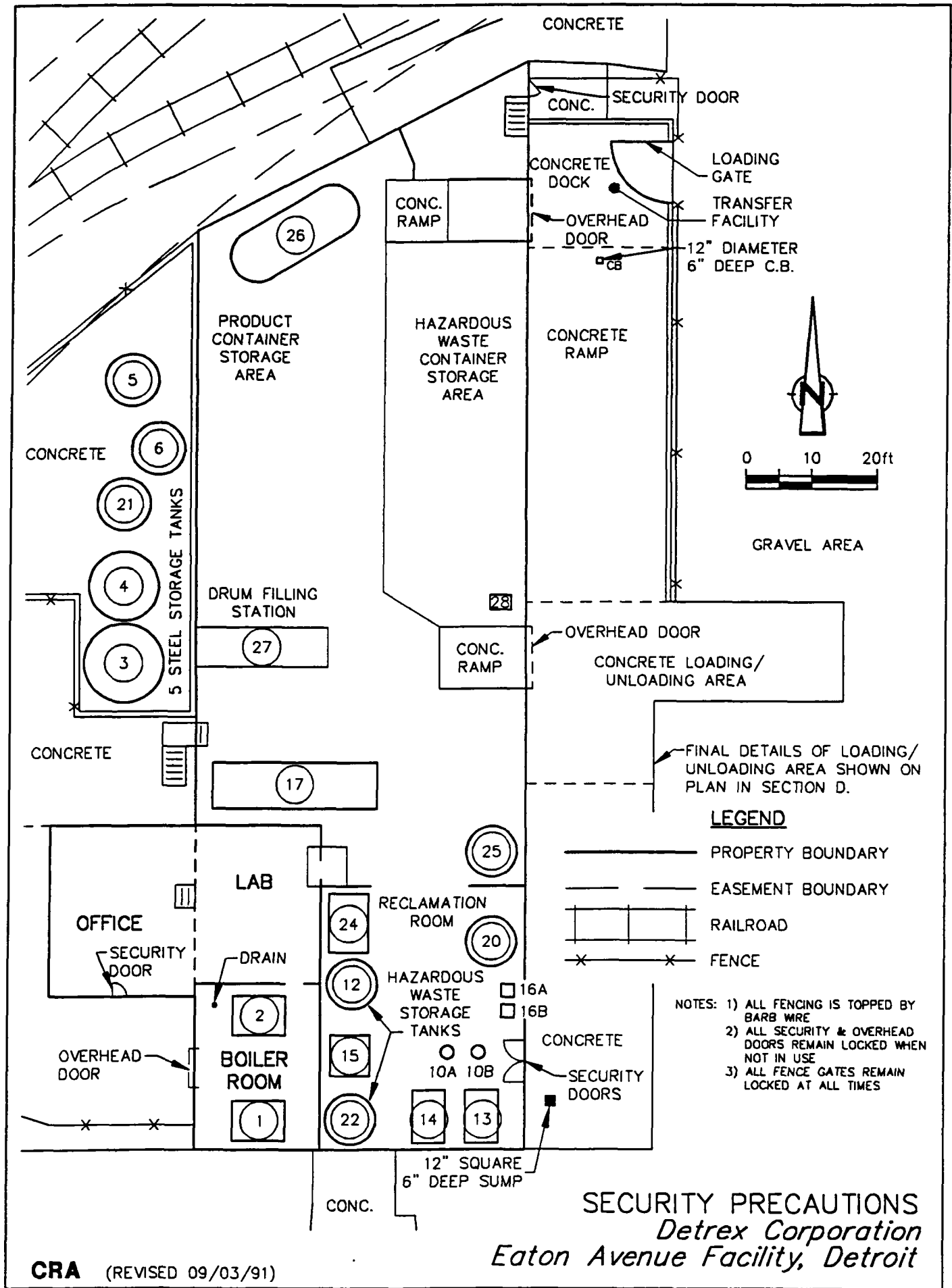
**F-5 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND
INCOMPATIBLE WASTES [40 CFR §270.14(b)(9)§264.17]**

There are no ignitable, reactive or incompatible wastes stored within the TSD facility; hence, an operating license for the handling of ignitable, reactive, and incompatible wastes is not requested.

ATTACHMENTS

ATTACHMENT F-1

SECURITY PRECAUTIONS



Date: 09/03/91

Revision: 91-2

LIST OF PROCESS EQUIPMENT

<i>I.D. No.</i>	<i>Equipment Name</i>	<i>Description</i>
1.	Generator	Clayton Model E-100 Steam Generator. Unit burns natural gas to produce steam at the rate of 3450 lbs./hr. at 100 psig.
2.	Air Compressor	
3.	20,000 gal. Product Tank	20,000 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
4.	10,000 gal. Product Tank	10,000 gallon carbon steel storage tank for storage of Trichloroethylene
5.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Perchloroethylene.
6.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Trichloroethylene
10 A/B	2 - 600 gal. Receiver Tanks	Used for receiving product from Detrex stills. (Operated at atm. pressure).
12.	2,300 gal. Hazardous Waste tank storage tank	2,300 gallon carbon steel storage tank used for storage of F001 or F002 material prior to processing
13.	350 gal. Detrex Still	Detrex Model S-350. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
14.	350 gal. Detrex Still	Detrex Model S-600. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
15.	DCI Still	DCI Model Dyna-1-100 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 100 gallons per hour.
16 A/B	Drying Columns	Detrex Dual Column Drier. Used to remove water from recovered product (solvent) via adsorption.

Date: 09/03/91

Revision: 91-2

LIST OF PROCESS EQUIPMENT

<i>I.D. No.</i>	<i>Equipment Name</i>	<i>Description</i>
17.	5,000 gal. Still Bottom Tank	5,000 gallon carbon steel storage tank. Used for temporary accumulation of still bottoms from recovery of chlorinated solvents (F002 material).
20.	2,500 gal. Holding Tank	2,500 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
21.	4,500 gal. 1,1,1 Trichloroethane	4,500 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
22.	4,500 gal. Hazardous Waste Storage Tank	4,500 gallon carbon steel storage tank used for temporary storage of F001 or F002 material prior to being processed by Detrex stills.
24.	DCI Still	DCI Model Dyna-1-500 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 500 gallons per hour.
25.	3,000 gal. Holding Tank	3,000 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
26.	SVRM - Carbon Absorption Unit	
27.	Drum Filling Station	Product Drumming Station. Used for filling 55-gallon drums with product. Unit can fill approximately 30 drums per hour and is operated as necessary.
28.	Product Blending Vessel	550 gallon carbon steel vessel utilized for product blending.

ATTACHMENT F-2

INSPECTION SCHEDULE

ATTACHMENT F-2

HAZARDOUS WASTE INSPECTION SCHEDULE

<i>Items</i>	<i>Type of Problem</i>	<i>Inspection Frequency</i>
Container storage area	<ul style="list-style-type: none"> - Leaking drums - Drum bungs secure - Corrosion - Proper stacking height - Proper labelling - Adequate aisle space 	Daily
Tank storage area and associated piping	<ul style="list-style-type: none"> - Leaking tanks or piping - Corrosion - Liquid level in tanks 	Daily
Transfer lines/Transfer pumps	<ul style="list-style-type: none"> - Leaking, cracking 	Daily
Interior Secondary containment	<ul style="list-style-type: none"> - Presence of liquid - Cracks, joints 	Daily
Loading/Unloading Area	<ul style="list-style-type: none"> - Presence of liquids - Cracks/joints 	Daily (when in use)
Absorbent material	<ul style="list-style-type: none"> - Adequate supply 	Daily
Doors	<ul style="list-style-type: none"> - Open freely - Locks function 	Daily
Fencing, Gates, Perimeter signs	<ul style="list-style-type: none"> - fencing intact - gates open freely, locks function - adequate signs present, legible 	Weekly
Electronic Surveillance System	<ul style="list-style-type: none"> - alarms functioning properly 	Weekly
Alarm system	<ul style="list-style-type: none"> - Functions 	Weekly

Date: 09/03/91
Revision: 91-2
Attachment: F-2

ATTACHMENT F-2

HAZARDOUS WASTE INSPECTION SCHEDULE

<i>Items</i>	<i>Type of Problem</i>	<i>Inspection Frequency</i>
Fire extinguishers	<ul style="list-style-type: none">- Available- Loss of pressure	Weekly
Self-contained breathing apparatus	<ul style="list-style-type: none">- Available- Loss of pressure in tank	Weekly
Respirator	<ul style="list-style-type: none">- Available	Weekly
Eye wash station/ Safety shower	<ul style="list-style-type: none">- Functions- Scale or rust in water	Weekly
First aid kit	<ul style="list-style-type: none">- Available- Adequate supplies	Weekly
Transporter Vehicle	<ul style="list-style-type: none">- empty- presence of liquids	Every Shipment

ATTACHMENT F-3

INSPECTION RECORDS

**DETREX CORPORATION
EATON AVENUE FACILITY
HAZARDOUS WASTE DAILY INSPECTION FORM**

<i>Inspection Item</i>	<i>Type of Problem</i>	<i>Problem Exists (Yes/No)</i>	<i>Remedial Action Required</i>	<i>Remedial Action Completed</i>
Container Storage Area	<ul style="list-style-type: none"> - leaking drums - drum bungs secure - corrosion - proper stacking height - proper labelling - adequate aisle space 			
Tank Area & Associated Piping	<ul style="list-style-type: none"> - leaking tanks or piping - corrosion - liquid level in tank 			
Transfer lines/ Transfer Pumps	<ul style="list-style-type: none"> - leaking, cracking 			
Interior Secondary Containment	<ul style="list-style-type: none"> - presence of liquid - cracks, joints 			
Loading/Unloading Area	<ul style="list-style-type: none"> - presence of liquids - cracks/joints 			
Adsorbent Material	<ul style="list-style-type: none"> - adequate supply 			
Doors	<ul style="list-style-type: none"> - opens freely - locks function 			

Specific Comments: _____

Inspection By: _____

Date: _____

**DETREX CORPORATION
EATON AVENUE FACILITY
HAZARDOUS WASTE WEEKLY INSPECTION RECORD**

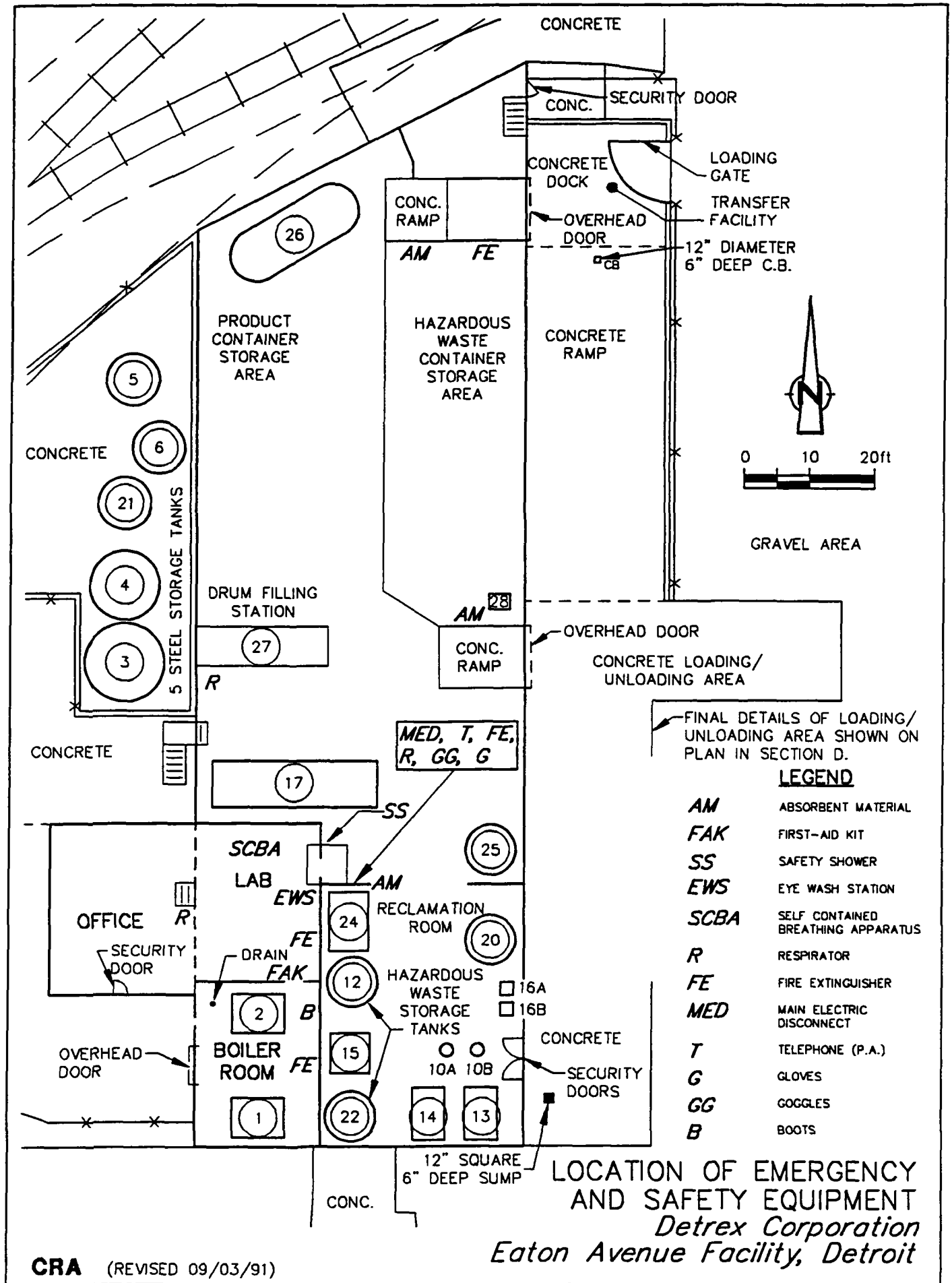
<i>Inspection Item</i>	<i>Type of Problem</i>	<i>Problem Exists (Yes/No)</i>	<i>Remedial Action Required</i>	<i>Remedial Action Completed</i>
Fencing/Gates/ Perimeter Signs	<ul style="list-style-type: none"> - fencing intact - gates open freely, locks function - adequate, legible signs 			
Electronic Surveillance System	<ul style="list-style-type: none"> - functions properly 			
Alarm System	<ul style="list-style-type: none"> - functions properly 			
Fire Extinguishers	<ul style="list-style-type: none"> - available - loss of pressure 			
Self-Contained Breathing Apparatus	<ul style="list-style-type: none"> - available - loss of pressure in tank 			
Respirator	<ul style="list-style-type: none"> - available 			
Eye Wash Station/ Safety Shower	<ul style="list-style-type: none"> - functions - scale or rust in water 			
First Aid Kit	<ul style="list-style-type: none"> - available - adequate supplies 			

Specific Comments: _____

Inspection By:
Date:
Time:

ATTACHMENT F-4

LOCATION OF EMERGENCY AND SAFETY EQUIPMENT



Date: 09/03/91
Revision: 91-2
Page: G-1

SECTION G

CONTINGENCY PLAN

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SECTION G

CONTINGENCY PLAN

This contingency plan has been prepared for the Detrex Corporation facility in Detroit, Michigan. The contingency plan has been designed to minimize hazards to human health or the environment and describes the actions facility personnel will take in response to fires, explosions, or any unplanned sudden or nonsudden release of hazardous waste or hazardous waste constituents at the facility.

The information is provided pursuant to Michigan Act 64 Rule 299.9607 which incorporates 40 CFR Part 264 Subpart D by reference. The applicable section(s) of the Federal Regulations (40 CFR) is referenced as appropriate.

G-1 GENERAL INFORMATION [40 CFR §270.14(b)(7), Part 264, Subpart D]

Detrex Corporation owns a solvent sales and recovery (recycling) operation and transfer facility, operated in Detroit, Michigan. The street location and mailing address for the facility is:

Detrex Corporation
12886 Eaton Avenue
Detroit, Michigan 48227
Telephone: (313) 491-4550

This facility is a warehouse for virgin halogenated hydrocarbon solvents and a recovery (recycling) facility for spent solvents that are recovered via distillation. The facility also operates a transfer facility under 40 CFR. The facility is classified as a treatment, storage, disposal (TSD) facility and operates under EPA identification number MID 091605972.

The hazardous waste management operations include container storage and tank storage. Wastes are received in drum or bulk shipments. The wastes are processed through the recovery (recycling) system which primarily consist of distillation followed by drying. The recovered solvent product is drummed or stored in product tanks for re-sale and the still bottoms remaining after distillation are transferred to a 5,000 gallon generator accumulation tank. The still bottoms are accumulated for less than 90 days prior to shipment off site to a permitted facility. The entire operation is located within a single enclosed building. Attachment G-1, is a facility plan locating the hazardous waste container and tank storage areas, process equipment, and the transfer facility.

The facility processes hazardous waste classified under EPA Hazardous Waste Numbers F001 and F002. D-series compounds are also recognized to be present within the wastes. Table G-1 lists all of the wastes permitted to be received at the facility. Material Safety Data Sheets for all materials handled at the facility are found in Attachment G-2.

The facility employs eight personnel involved in various activities. A sign in/sign out sheet is maintained in the office by the secretary to identify the employees or visitors on-site at a given time.

This contingency plan contains emergency provisions to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents for the entire facility.

TABLE G-1
LIST OF HAZARDOUS WASTES
STORED IN FACILITY

<i>Hazardous Waste</i>	<i>EPA Hazardous Hazardous Waste Number</i>	<i>Hazardous Constituent/Characteristic</i>
1,1,1 Trichloroethane	F001/F002	Toxic
Trichloroethylene	F001/F002	Toxic
Methylene chloride	F001/F002	Toxic
Perchloroethylene	F001/F002	Toxic
Trichlorotrifluoroethane (Freon)	F001/F002	Toxic
Arsenic	D004	Toxic
Barium	D005	Toxic
Cadmium	D006	Toxic
Chromium	D007	Toxic
Lead	D008	Toxic
Mercury	D009	Toxic
Selenium	D010	Toxic
Silver	D011	Toxic
Benzene	D018	Toxic
Carbon Tetrachloride	D019	Toxic
Chlorobenzene	D021	Toxic
Chloroform	D022	Toxic
1,4-Dichlorobenzene	D027	Toxic
1,2-Dichloroethane	D028	Toxic
1,1-Dichloroethylene	D029	Toxic
2,4-Dinitrotoluene	D030	Toxic
Hexachloroethane	D034	Toxic
Methyl Ethyl Ketone	D035	Toxic
Nitrobenzene	D036	Toxic
Pyridine	D038	Toxic
Tetrachloroethylene	D039	Toxic
Trichloroethylene	D040	Toxic
Vinyl Chloride	D043	Toxic

G-2 EMERGENCY COORDINATORS [40 CFR §264.52(d) §264.55]

If an imminent or actual emergency is discovered, the Emergency Coordinator (either on the facility premises or on call) will be immediately notified. The primary Emergency Coordinator will be contacted first; if he is not available, the alternates will be contacted (in the order listed) until one is reached. The primary Emergency Coordinator and the alternates listed in the order they are to be contacted are listed in Table G-2 with their job title, contact numbers and home addresses.

The employee who discovers an imminent or actual emergency shall take responsibility for notifying the Emergency Coordinator or an alternative. At least one of the designated Emergency Coordinators will either be at the facility or on call and available to come to the facility, to respond to an emergency seven (7) days per week.

The Emergency Coordinator is thoroughly familiar with all aspects of the contingency plan, all operations and activities at the facility, the location and characteristics of wastes handled, the locations of all records within the facility, and the facility layout. The Emergency Coordinator has the authority to commit the resources necessary to implement the contingency plan. The Emergency Coordinator coordinates and directs all response efforts and personnel.

In the event that the Detroit Fire Department (DFD) responds to an emergency at the facility, the DFD Supervisor assumes the duties and authorities of the Emergency Coordinator. The Supervisor and the Emergency Coordinator then act together to coordinate and direct the response effort. The plant Emergency Coordinator's principal authority is to effectively provide the DFD Supervisor with comprehensive and detailed information concerning plant operations and the location and characteristics of materials handled.

A listing of the emergency response agencies and organizations which may be called upon to provide emergency assistance at the facility is provided in Table G-3 with their appropriate contact numbers.

At present, the local Police and Fire Departments and the local Hospital have a copy of the contingency plan.

TABLE G-2
EMERGENCY COORDINATORS

<i>Name</i>	<i>Job Title</i>	<i>Work Phone</i>	<i>Home Phone</i>	<i>Home Address</i>
<u>Primary</u>				
Ronald Hritzkowin	Operations Manager	(313) 491-4550	(313) 354-0930	23589 Lahser Southfield, Michigan 48035
<u>Alternate</u>				
Levi Douglass	Warehouse Manager	(313) 491-4550	(313) 863-0586	18615 Muirlend Detroit, Michigan 48221
Joseph Calderoni	Quality Control Coordinator	(313) 491-4550	(313) 728-2117	643 Forest Westland, Michigan 48185

TABLE G-3

EMERGENCY RESPONSE AGENCIES/ORGANIZATIONS

<i>Name</i>	<i>Phone Number</i>
Police Department	911
Fire Department	911
Mount Carmel Mercy Hospital	(313) 927-7000
National Response Center	800-424-8802
Detrex Corporation Risk Management Group	(313) 358-5800
Michigan Department of Natural Resources, Michigan Pollution Emergency Alerting System	800-294-4706
Emergency Spill Clean-Up Companies	
- Marine Pollution Control	(313) 849-2333
- Environmental Waste Control Inc.	(313) 561-1400
- K&D Industrial Services Inc.	(313) 326-3550

G-3 IMPLEMENTATION OF CONTINGENCY PLAN
[40 CFR §264.52(a) §264.56(d)]

The provisions of this contingency plan must be carried out immediately whenever there is an imminent or actual incident, such as fire, explosion, or release of hazardous waste or hazardous waste constituents which could adversely threaten human health or the environment. Minor leaks or spills in the hazardous waste container or tank storage areas would not normally trigger the implementation of the Contingency Plan, but would be managed by the Emergency Coordinator or his alternate. This section of the Contingency Plan offers the Emergency Coordinator guidelines to evaluate the need to implement the Contingency Plan.

The contingency plan will be implemented in the following situations:

A. Fire and/or Explosion

1. A fire causes the release of toxic fumes.
2. The fire spreads and could possibly ignite materials at other locations on site or could cause heat-induced explosions.
3. The fire could possibly spread to off-site areas.
4. Contamination could spread from the use of water or water and chemical fire suppressants external to the facility.
5. An explosion has occurred or an imminent danger exists that an explosion could occur at the facility.

B. Spill or Material Release

1. The spill (minor or major) could result in release of toxic liquids or vapors, thus causing a fire or gas explosion hazard or health hazard.
2. A minor or major spill that could result in soil and/or groundwater contamination.

G-4 EMERGENCY RESPONSE PROCEDURES [40 CFR §264.56]

**G-4a Notification/Identifications/Assessment/Reporting
[40 CFR §264.56]**

In the event of an emergency, the Emergency Coordinator or his alternate will be contacted immediately and will:

- 1) If it is an imminent or actual emergency, involving sudden or non-sudden release, by fire, explosion or otherwise so as to threaten human health or the environment, the Emergency Coordinator will immediately warn facility personnel and appropriate emergency response authorities. The procedures listed below with regards to appropriate notification of the proper authorities shall be followed as soon as possible once the safety of personnel is assured.
- 2) Determine the origin, location, nature and extent of the problem;
- 3) Establish a command post from which to coordinate and direct the overall emergency response effort (The command post would likely be the main facility office where a telephone and a copy of this Contingency Plan are available);
- 4) Inform other personnel of the situation;
- 5) If it is a localized situation, not involving sudden or non-sudden release, by fire, explosion or otherwise, of hazardous waste or hazardous waste constituents so as to threaten human health or the environment, handle the matter according to routine procedures;

Notification

1. Notify appropriate national, state, and/or local departments, agencies and organizations with designated response roles, including the Risk Management Group of Detrex Corporation (See Table G-3.)
2. When notifying response teams, the Emergency Coordinator should be prepared to furnish the following information:
 - a) Name and telephone number of reporter:
 - b) Name and address of facility:
 - c) Time and type of incident (e.g. release, fire):
 - d) Name and quantity of material(s) involved and to what extent:
 - e) The extent of injuries if any, and:

- f) The possible hazards to human health or the environment outside of the facility.

Identification

Identify the character, exact source, amount and areal extent of any released materials. This may be accomplished by observation or review of facility records or manifests, and, if necessary, by chemical analysis.

Assessment

Assess possible hazards to human health or the environment that may result from the release, fire, or explosion. This assessment shall consider both direct and indirect effects of the release, fire, or explosion, including the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water runoff from water or chemical agents used to control fire and heat-induced explosions.

The procedure for assessing possible hazards includes:

1. Identification of hazardous properties of the materials involved or by-products thereof.
2. Determination of threat to human health or the environment, both on site and off site.
3. Assess any environmental conditions (e.g. windspeed and direction) that may contribute to the seriousness of the hazard.
4. Determine the readiness and availability of response equipment, both on site and off site.

Reporting

If the Emergency Coordinator determines that the release, fire, or explosion could threaten human health or the environment outside the boundaries of the facility, he shall:

- 1) If his assessment of the emergency indicates that evacuation of the surrounding local areas may be advisable, immediately notify the Detroit Fire Department and Detroit Police Department at 911 and any other appropriate authorities as deemed necessary including the National Response Center.

- 2) Immediately contact all other appropriate departments, agencies and organizations with designated response orders and relate to them the specific information they require to respond (see Notification).

G-4b Control Procedures [40 CFR §264.52(a)]

Potential accidents are classified into three general areas:

- 1) Fire and/or explosion involving hazardous waste or hazardous waste constituents;
- 2) Accidental release in a liquid form of hazardous waste or hazardous waste constituent; and
- 3) Accidental release in the form of a vapor of hazardous waste or hazardous waste constituent.

G-4b(1) Fire and/or Explosion

The hazardous waste container storage area is accessible by fire-fighting and other emergency equipment. Response procedures in the event of a fire and/or explosion will be as follows:

- 1) Plant personnel will notify the office via telephone.
- 2) The Emergency Coordinator will be notified.
- 3) If a fire is minor, facility fire-fighting equipment such as fire extinguishers and fire hoses would be used, to extinguish the fire.
- 4) If a fire and/or explosion is major, the Detroit Fire Department will be contacted at 911, as well as other authorities as deemed necessary.
- 5) Any operating units such as process equipment, boilers, pumps, etc., would be shut down using main disconnect.
- 6) In the event that Step 3 fails to control the fire, Steps 4 and 5 will be implemented and all employees will immediately vacate the premise. Personnel will meet and be accounted for at the parking lot in front of the facility.

- 7) The Emergency Coordinator has the authority to direct other necessary actions as required.
- 8) An "all clear" signal will be given over the facility public address system when the fire and/or explosion has been extinguished and the personnel's safety is no longer endangered.
- 9) After a fire and/or explosion has been extinguished, clean-up procedures will commence. All emergency equipment used must be replaced, repaired, recharged or otherwise be in good operating condition and placed in the appropriate location before normal operations resume.

G-4b(2) Accidental Release, Liquid

If an accidental release of liquid occurs which cannot be controlled with absorbent material, the following steps will be taken:

- 1) Plant personnel will notify the office via telephone.
- 2) The Emergency Coordinator will be notified. Appropriate Emergency Response Agencies (i.e. Emergency Spill Cleanup) as listed in Table G-2 will be notified as deemed necessary.
- 3) The exact source and type of release of hazardous waste or hazardous waste constituent will be determined.
- 4) All pump(s) contributing to the release will be shut off.
- 5) Any section(s) of pipe contributing to the release will be isolated by closing the appropriate valves.
- 6) If the discharge is from a drum, the drum will be turned to orient the leak towards the top.
- 7) If the discharge is from a tank, the exact source of the discharge will be located and, if possible, isolated (i.e., leakage from a valve which is piped to the tank, packing or flanges may be adjusted to stop the leak).
- 8) A temporary dike of absorbent material will be placed around the discharge area.

- 9) Emergency ventilation fans will be activated and doors to the outside will be opened.
- 10) Plant personnel will be evacuated from building, if deemed necessary. Personnel will meet and be accounted for at parking lot in front of the facility.
- 11) Clean-up procedures, which may include notification of a spill clean-up firm, furnishing the clean-up crew with physical and/or chemical properties of waste and amount of waste released, shall be implemented.
 - a) Clean-up of released waste: The waste will be collected via use of absorbent material for small spills. The collected material will then be placed in DOT-approved containers and stored in a segregated area of the container storage area. The containers will be clearly labelled describing the source of the material. The material will subsequently be characterized as F001 or F002 material based on the source of the spilled material. The material would then be transported to an off-site facility permitted to receive the material in accordance with all state and federal regulations. For large spills, the waste will be collected with a wet-vac or pump and placed into DOT-approved containers in the container storage area. The waste would be characterized based on the source of the spilled material and subsequently be reclaimed (recycled) on-site. Residual material would be handled as described above for small spills.
 - b) Decontamination: Following cleanup with absorbent material, the affected area of the secondary containment area will be swept and all sweepings will be containerized and handled as identified above for small spills. The pad may be subsequently decontaminated by steam cleaning. Any wash waters generated will be collected in DOT-approved containers and transported off site for treatment/disposal at a permitted facility as described above unless the material meets the specifications for discharge in accordance with the facility's Detroit Water and Sewerage Department Wastewater Discharge Plant.
 - c) Cleanup of Contamination Soil: Should the spill or release occur outside the secondary containment area (i.e. external to the building and the loading/unloading area), cleanup will be accomplished by a firm specializing in such procedures. All visually contaminated soil, where practical, will be excavated

and placed in a temporary storage containers (i.e. drum, lugger box) pending characterization for ultimate disposal. The base of the excavation would subsequently be sampled to ensure all contaminated soil has been removed. Analysis of soil samples for volatile organic compounds utilizing U.S. EPA Method 8240 (SW-846) would be conducted. Any soils exhibiting detectable levels of volatile organic compounds would be excavated and the new base of excavation re-sampled. All excavated material would subsequently be characterized as F001 or F002 material, based on the characterization of the spilled material, for secure disposal at a permitted off-site facility.

- 12) Emergency equipment used, must be replaced, repaired, recharged or otherwise be in good operating condition and placed in the appropriate location before operations resume.

G-4b(3) Accidental Release, Vapor

Steam to the distillation unit will be shut off immediately (cooling water will remain on to condense vapors in the distillation unit).

- 1) Plant personnel will notify the office via telephone.
- 2) The Emergency Coordinator will be notified.
- 3) Emergency exhaust fans will be activated and all doors to the outside will be opened.
- 4) If major, the local fire department will be called by telephone. Any operating units such as boilers, air conditioning or heating systems, pumps, etc. will be shut down immediately. Personnel will be evacuated from the building and will meet at the parking lot in front of the building to be accounted for. Appropriate Emergency Response Agencies as listed in Table G-3 will be notified as deemed necessary.
- 5) Clean up procedures will be initiated.

G-4c Prevention of Recurrence or Spread of Fires, Explosions or Releases [40 CFR§264.56(e)]

Actions to prevent the recurrence or spread of fires, explosions or releases may include:

- 1) Halting processes and operations.
- 2) Collecting and containing released wastes.
- 3) Prohibiting smoking in all areas except designated smoking areas.
- 4) Using non-sparking tools.
- 5) Protecting the area from open flame or heat generating activities.
- 6) Monitoring all valves, pipes or equipment for leaks or ruptures.

All reasonable safety procedures will be followed prior to resuming operations.

G-4d Storage and Treatment of Released Material
[40 CFR§264.56(g)]

Immediately after an emergency, the Emergency Coordinator will make arrangements for proper treatment, storage and/or disposal of all water and contaminated materials resulting from the release, fire or explosion. All resulting wastes generated will be considered a RCRA hazardous waste and managed as a RCRA waste unless it can be demonstrated to be non-regulated.

G-4e Incompatible Wastes [40 CFR§264.56(h)(l)]

The Emergency Coordinator will insure that wastes, which may be incompatible with the released material, are treated, stored, or disposed until cleanup procedures are completed.

G-4f Post-Emergency Equipment Maintenance
[40 CFR§264.56(h)(2)]

After an emergency event, or as required during the emergency response, all emergency equipment utilized in the affected area will be cleaned, or replaced, so that they are suitable for future use. Prior to resuming operations, an inspection of all utilized safety equipment will be conducted. All proper authorities will be notified that the post-emergency equipment maintenance has been performed and operations will resume.

G-4g Container Spills and Leakage [40 CFR §264.52, §264.171]

The procedures to be implemented when responding to a spill or leak from a container were described in Section G-4b(2), previously.

G-4h Tank Spills and Leakage [40 CFR §264.194(c)]

Contingency plan will be implemented, as necessary, should an accidental release of liquid occur from the recycling process equipment or generator accumulation tanks or transfer facility. The procedures to be implemented when responding to a spill or leak were described in Section G-4b(2), previously.

G-5 EMERGENCY EQUIPMENT [40 CFR §264.52(e)]

The type and physical location of facility's emergency equipment, including fire equipment, spill control equipment, breathing apparatus and medical treatment facilities is presented in Attachment G-3. A brief discussion of each aspect of the Emergency Equipment follows.

1) Communications System

- telephone/public address system
- sound 911 personal protection signal horn

2) Fire Control Systems and Equipment

- fire extinguishers
 - 4 ANSUL 10 lb ABC Type
 - 1 ANSUL 20 lb BC Type
 - 1 KIDDE 200 lb BC Type
 - 1 KIDDE 5 lb BC Type
- fire hydrants - 2 hydrants located directly in front of facility

3) Spill Control Equipment

- absorbent material:
 - Sorbent Pad - 3M Type T-156 (24" x 24")
 - Industrial Absorbent - EVCO (50 lb bags)

4) Health and Medical Emergency Equipment/Supplies

- respirators (Wilson Model 1070 Full-face respirator)
- SCBA (3 MSA Mask Model 401 Pressure Demand)
- Safety shower & eye wash (connected to city water supply)
- first-aid kit (DOT Health Care Cabinet sized for 20 people)
- gloves (leather and chemical resistant)
- boots & shoes (chemical resistant)
- company uniforms (daily change provided)
- total body coveralls (available)

G-6 COORDINATION AGREEMENTS [40 CFR §264.37/§264.52(c)]

To familiarize police, fire department and hospital officials with the layout of the facility, properties of the hazardous wastes handled at the facility and associated hazards, entrances to the facility, possible evacuation routes, and other aspects of the facility, copies of the contingency plan have been submitted to the appropriate officials.

Each person, or the chief officer of each department, agency or organization which received a copy of the contingency plan was asked to sign a Coordination Agreement form to acknowledge that he/she reviewed the plan, understood the department's, agency's, or organization's role under the plan, and that all members of the department, agency, or organization will be informed of the plan's content and their individual responsibilities. Signed agreements are maintained on file in the office.

G-7 EVACUATION PLAN [40 CFR §264.52(f)]

If an emergency occurs which cannot be adequately responded to by plant personnel, the Emergency Coordinator will signal employees by way of facility public address system to evacuate the facility. Employees will exit the facility by the most expeditious route (refer to Attachment G-4 for emergency routes). Once outside the building, employees will meet at the parking lot in front of the facility to be accounted for. The Emergency Coordinator will then notify the proper emergency response teams. The Emergency Coordinator, based on this assessment, may deviate from established procedures in order to effectively and safely respond to emergency situations.

G-8 REQUIRED REPORTS [40 CFR §264.56(j)]

As required, any emergency event requiring implementation of the contingency plan will be reported in writing to the MDNR Director within fifteen (15) days of the event. This report will, at minimum, contain:

- 1) Name, address, and telephone number of the owner or operator;
- 2) Name, address, and telephone number of the owner or facility;
- 3) Date, time, and type of incident (ie. fire, explosion);
- 4) Name and quantity of materials involved;
- 5) The extent of injuries, if any;
- 6) The assessment of actual or potential hazards to human health or the environment, where this is applicable; and
- 7) Estimated quantity and disposition of recovered material that resulted from the incident.

It will be the responsibility of The Risk Management Group of Detrex Corporation to submit reports to the appropriate agencies and to retain on file all applicable information in the event that the contingency plan was implemented.

The Risk Management Group of Detrex will also inform the appropriate departments, agencies and authorities that clean-up is complete before operations at the facility resume.

Detrex will place in the operating record all reports of any incident that requires implementing the contingency plan.

G-9 AMENDMENTS TO THE CONTINGENCY PLAN [40 CFR §264.54]

The contingency plan will be reviewed and immediately amended, if necessary, whenever:

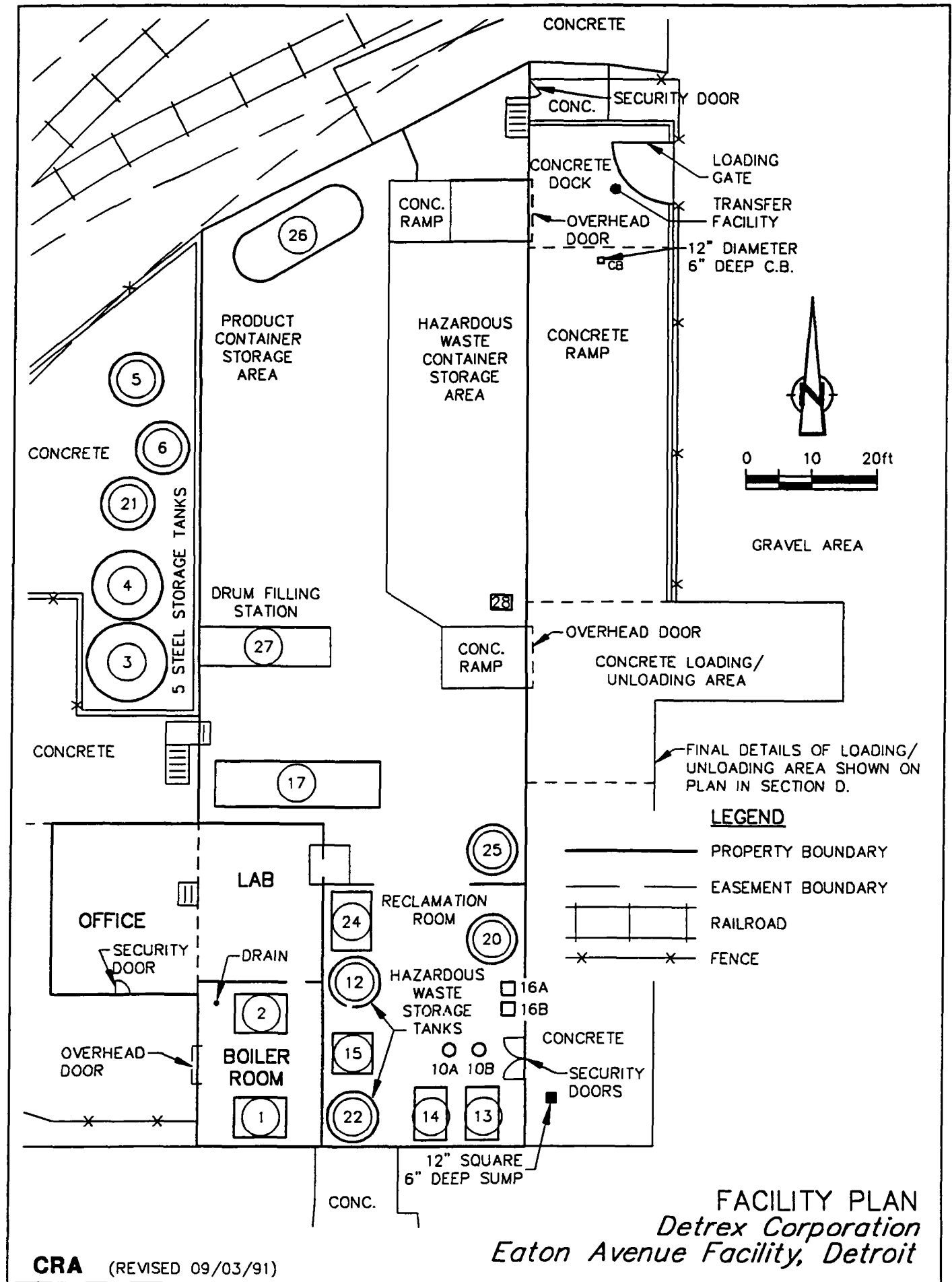
- 1) the facility permit is revised
- 2) the plan fails in an emergency
- 3) the list of emergency coordinators changes
- 4) the list of emergency equipment changes
- 5) the facility alters its design, construction, operation, maintenance, or other circumstances in a way materially increasing the potential for fires, explosions or releases of hazardous waste/or hazardous waste constituents
- 6) the actions/responses necessary to comply in an emergency situation change

All changes in this plan will be sent to every person, agency, department and organization on the contingency plan distribution list within 30 days of the effective date of the change.

ATTACHMENTS

ATTACHMENT G-1

FACILITY PLAN



Date: 09/03/91
Revision: 91-2

LIST OF PROCESS EQUIPMENT

<i>I.D. No.</i>	<i>Equipment Name</i>	<i>Description</i>
1.	Generator	Clayton Model E-100 Steam Generator. Unit burns natural gas to produce steam at the rate of 3450 lbs./hr. at 100 psig.
2.	Air Compressor	
3.	20,000 gal. Product Tank	20,000 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
4.	10,000 gal. Product Tank	10,000 gallon carbon steel storage tank for storage of Trichloroethylene
5.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Perchloroethylene.
6.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Trichloroethylene
10 A/B	2 - 600 gal. Receiver Tanks	Used for receiving product from Detrex stills. (Operated at atm. pressure).
12.	2,300 gal. Hazardous Waste tank storage tank	2,300 gallon carbon steel storage tank used for storage of F001 or F002 material prior to processing
13.	350 gal. Detrex Still	Detrex Model S-350. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
14.	350 gal. Detrex Still	Detrex Model S-600. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
15.	DCI Still	DCI Model Dyna-1-100 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 100 gallons per hour.
16 A/B	Drying Columns	Detrex Dual Column Drier. Used to remove water from recovered product (solvent) via adsorption.

Date: 09/03/91

Revision: 91-2

LIST OF PROCESS EQUIPMENT

<i>I.D. No.</i>	<i>Equipment Name</i>	<i>Description</i>
17.	5,000 gal. Still Bottom Tank	5,000 gallon carbon steel storage tank. Used for temporary accumulation of still bottoms from recovery of chlorinated solvents (F002 material).
20.	2,500 gal. Holding Tank	2,500 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
21.	4,500 gal. 1,1,1 Trichloroethane	4,500 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
22.	4,500 gal. Hazardous Waste Storage Tank	4,500 gallon carbon steel storage tank used for temporary storage of F001 or F002 material prior to being processed by Detrex stills.
24.	DCI Still	DCI Model Dyna-1-500 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 500 gallons per hour.
25.	3,000 gal. Holding Tank	3,000 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
26.	SVRM - Carbon Absorption Unit	
27.	Drum Filling Station	Product Drumming Station. Used for filling 55-gallon drums with product. Unit can fill approximately 30 drums per hour and is operated as necessary.
28.	Product Blending Vessel	550 gallon carbon steel vessel utilized for product blending.

ATTACHMENT G-2

MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheet

MSD 8208.20

DETREX CHEMICAL INDUSTRIES, INC.
P.O. BOX 501
DETROIT, MICHIGAN 48232



Approved by U.S. Dept. of Labor as "Essentially similar" to Form OSHA-20

Date: August, 1982	Edition: First
Chemical Name and Synonyms: 1,1,1-trichloroethane; methylchloroform CAS No. 71-55-6	Trade Name and Synonyms: PERM-ETHANE 3 DG
Chemical Family: <u>Halogenated Hydrocarbons</u>	Formula: CH_3CCl_3
DOT Shipping Name: 1,1,1-trichloroethane	DOT Hazard Class: ORM-A
	I. D. Number: UN 2831

SECTION 1 • PHYSICAL DATA

Boiling Point @ 760 mm Hg: 165.4°F	Vapor Density (Air=1): 4.54	Specific Gravity ($\text{H}_2\text{O}=1$): 1.300-1.320 @ 25°/25°C	pH of Solutions: 6.0 to 7.5
Freezing/Melting Point: -49°F -45°C	Solubility (Weight % in Water): Negligible	Bulk Density: 10.80-10.97 lbs/gal @25°C	Volume % Volatile: Essentially 100
Vapor Pressure: @25°C = 135mmHg	Evaporation Rate (ethyl ether = 1): 0.35	Heat of Solution: Not Applicable	Appearance and Odor: Clear, colorless liquid - ether-like odor.

SECTION 2 • HAZARDOUS INGREDIENTS

	%	Hazard Data
1,1,1-trichloroethane (Stabilized)	100	See Sections 4 & 5

SECTION 3 • FIRE AND EXPLOSION HAZARD DATA

Flash Point °F (Method Used) None when tested in accordance with DOT requirements	Flammable Limits in Air (% by Volume) LEL: 7% UEL: 15% See Below	Extinguishing Media: water, dry chemical or carbon dioxide
Special Fire Fighting Procedures: Fire fighters should wear a NIOSH/MSHA-approved pressure-demand, self-contained breathing apparatus for possible exposure to hydrogen chloride and possibly traces of phosgene. Use water only in degreasers when aluminum reaction occurs.		
Unusual Fire and Explosion Hazards: Vapors concentrated in a confined or poorly ventilated area can be ignited upon contact with a spark, flame, or high intensity source of heat. This can occur at concentrations ranging between 7-15% by volume. Decomposition or burning can produce hydrogen chloride or possibly traces of phosgene. Also see Detrex warning letter Form SoL 8208.21 attached.		

SECTION 4 • HEALTH HAZARD DATA

Toxicity Data	Classification (Poison, Irritant, Etc.)
LC ₅₀ Inhalation (rat) 8,000 ppm/7 hours	Inhalation: Toxic
LD ₅₀ Dermal (rabbit) 15g/kg ⁽²⁾	Skin/Eye: Liquid mildly irritating to skin; eye irritant
LD ₅₀ Ingestion (rat) 10-12g/kg (See Section 5)	Ingestion: Not significantly toxic
Fish, LC ₅₀ (Lethal Concentration) Not Determined	Aquatic:

Human Exposure Information/Data:

24-HOUR EMERGENCY ASSISTANCE: (313) 358-5800

SECTION 5 • EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

Permissible Exposure Limits (TLV):

350 ppm - 8-hour time-weighted average (TWA) - OSHA 29CFR 1910.1000 (May 28, 1975).

Acute

Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory system, dizziness, nausea, lightheadedness, headache, loss of coordination and equilibrium, unconsciousness and, if exposed to high concentrations in confined or poorly ventilated areas, even death. Depression of the circulatory system has been reported as a result of overexposure to 1,1,1-trichloroethane. The heart may be sensitized by overexposure and ventricular arrhythmia may be induced by epinephrine administration.

Liquid splashed in the eyes can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

Chronic

Prolonged exposure above the OSHA permissible exposure limits may result in liver and kidney damage. 1,1,1-trichloroethane has been extensively studied for cancer both in the U.S. and Europe by government, industry and academia. There is no documented evidence that 1,1,1-trichloroethane causes an increased cancer incidence in humans.

EMERGENCY AND FIRST AID PROCEDURES:

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

Eye or Skin Contact: Flush eyes and skin with plenty of water (soap and water for skin) for at least 15 minutes, while removing contaminated clothing and shoes. If irritation occurs, consult a physician.

Ingestion: If conscious, drink large quantities of water. DO NOT induce vomiting. Take immediately to a hospital or physician. If unconscious, or in convulsions, take immediately to a hospital. DO NOT give anything by mouth to an unconscious person.

Notes to Physician (Including Antidotes): NEVER administer adrenalin following 1,1,1-trichloroethane overexposure. Increased sensitivity of the heart to adrenalin may be caused by overexposure to 1,1,1-trichloroethane.

SECTION 6 . REACTIVITY DATA

Stability: Stable	Conditions to Avoid: Avoid open flames, hot glowing surfaces or electric arcs.
Hazardous Polymerization: Will not occur.	Conditions to Avoid: None

Incompatibility (Materials to Avoid):

Avoid contamination with caustic soda, caustic potash or oxidizing materials. Shock sensitive explosives may be formed. Avoid contact with aluminum, magnesium, zinc and alloys thereof under high pressures. See Detrex warning letter Form SoL 8208.21 attached.

Hazardous Decomposition Products: Hydrogen chloride and possibly traces of phosgene.

SECTION 7 . SPILL OR LEAK PROCEDURES (See Detrex Forms SoL 8208.14 and SoL 8208.15 attached)

Steps to be Taken if Material is Spilled or Released: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. DO NOT flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc., as necessary and place in closed containers for disposal. (See Below)

Waste Disposal Method: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be re-processed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 • SPECIAL PROTECTION INFORMATION

Respiratory Protection: For emergencies or working in confined areas, wear self-contained breathing apparatus or supplied air respiratory protection (use the "buddy system" and wear a safety harness with a lifeline). In other circumstances involving potential overexposure, use NIOSH/MSHA-approved organic vapor respirator. (Observe limitations directed by manufacturer.) Respiratory protection program must be in accordance with 29CFR 1910.134.

Ventilation (Type): Dilution (General) or Local Exhaust - Sufficient to maintain workplace concentration below permissible exposure limits.

Eye Protection: Splashproof Goggles

Gloves: polyethylene, neoprene or polyvinyl alcohol

Other Protective Equipment: Safety shower and eye-wash fountain in immediate area. Personnel protective clothing and use of equipment must be in accordance with 29CFR 1910.133 and 29CFR 1910.132.

SECTION 9 • SPECIAL PRECAUTIONS

Precautions to be Taken During Handling and Storing:

- Do not use in poorly ventilated or confined areas.
- 1,1,1-trichloroethane vapors are heavier than air and will collect in low areas.
- Keep container closed when not in use.
- Do not store in open, unlabeled or mislabeled containers.
- Liquid oxygen or other strong oxidants may form explosive mixtures with 1,1,1-trichloroethane.
- This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and traces of phosgene.
- AVOID CONTAMINATION OF WATER SUPPLIES: Handling, storage, and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.
A chlorinated solvent used as a flashpoint suppressant must be added in sufficient quantity or the resultant mixture may have a flashpoint lower than the flammable component.
- Caution should be taken not to use in pressurized or totally enclosed system of light metal construction such as aluminum, magnesium, zinc or alloys thereof. Example, paint or adhesive spray system. (See Detrex Form SoL 8208.21 attached.)

Other Precautions:

- AVOID PROLONGED OR REPEATED BREATHING OF VAPORS. High vapor concentrations can cause dizziness, unconsciousness or death. Long-term overexposure may cause liver/kidney injury.
- USE ONLY WITH ADEQUATE VENTILATION. Ventilation must be sufficient to limit employee exposure to 1,1,1-trichloroethane below OSHA permissible limits (8-hour TWA 350 ppm). Observance of lower limits (outlined in Section 4) is advisable.
- AVOID CONTACT WITH EYES. Will cause irritation and pain.
- AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. May cause irritation or dermatitis.
- DO NOT TAKE INTERNALLY. Swallowing may cause injury or death.
- DO NOT EAT, DRINK, OR SMOKE IN WORK AREAS.

References:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978
2. Industrial Hygiene and Toxicology, Volume II, Second Edition, F. A. Patty, 1963
3. Dangerous Properties of Industrial Materials, Fifth Edition, N. I. Sax, 1979
4. Industrial Toxicology, Hamilton and Hardy, 1974
5. Toxicity and Metabolisms of Industry Solvents, Browning, 1965
6. Toxicology, the Basic Science of Poisons, Casarett and Doull, 1980
7. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980
8. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980

Comments:

As this solvent (1,1,1-trichloroethane) is used to clean and/or degrease a wide variety of metal and plastic parts, it should always be used in conjunction with properly designed and fully controlled degreasing equipment that is in compliance with the U.S. Environmental Protection Agency, OAQPS Guidelines, "Control of Volatile Organic Emissions from Solvent Metal Cleaning", and/or all other applicable federal, state and local regulatory guidelines.

Material Safety Data Sheet

MSD 8208.19

DETREX CHEMICAL INDUSTRIES, INC.
P.O. BOX 501
DETROIT, MICHIGAN 48232



Approved by U.S. Dept. of Labor as "Essentially similar" to Form OSHA-20

Date: August, 1982	Edition: First
Chemical Name and Synonyms: Trichloroethylene; trichloroethene CAS No.: 79-01-6	Trade Name and Synonyms: PERM-A-CLOR [®] NA, Trichlor, Trichlorethylene
Chemical Family: Halogenated Hydrocarbons	Formula: $\text{CHCl}_3 = \text{CCl}_2$
DOT Shipping Name: trichloroethylene	DOT Hazard Class: ORM-A UN1710 (RQ 1000#/454kg)

SECTION 1 • PHYSICAL DATA

Boiling Point @ 760 mm Hg: 188°F	Vapor Density (Air=1): 4.54	Specific Gravity ($\text{H}_2\text{O}=1$): (20°/20°C) 1.465	pH of Solutions: 6.7 to 7.5
Freezing/Melting Point: -123.5°F -86.4°C	Solubility (Weight % in Water): 0.11 @ 25°C	Bulk Density: @ 20°C 12.2 lbs./gal.	Volume % Volatile: Essentially 100
Vapor Pressure: @ 20°C = 57.8mmHg	Evaporation Rate (ethyl ether=1): 0.28	Heat of Solution: Not Applicable	Appearance and Odor: Clear, colorless liquid with ether-like odor.

SECTION 2 • HAZARDOUS INGREDIENTS

	%	Hazard Data
Trichloroethylene (Stabilized)	100	See Sections 4 and 5

SECTION 3 • FIRE AND EXPLOSION HAZARD DATA

Flash Point °F (Method Used) None when tested in accordance with DOT requirements. (See Below)	Flammable Limits in Air (% by Volume) See Below LEL: 12.5% UEL: 90%	Extinguishing Media: Water, dry chemicals or carbon dioxide.
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Special Fire Fighting Procedures: Fire fighters should wear NIOSH/MSHA pressure-demand, self-contained breathing apparatus for possible exposure to hydrogen chloride and possibly traces of phosgene.

Unusual Fire and Explosion Hazards: Vapors concentrated in a confined or poorly ventilated area can be ignited upon contact with a spark, flame or high-intensity source of heat. This can occur at concentrations of approximately 12.5% and above by volume. Decomposition or burning can produce hydrogen chloride and possibly traces of phosgene.

Also see Detrex warning letter Form SoL 8208.21 attached.

SECTION 4 • HEALTH HAZARD DATA

Permissible Exposure Limits (TLV): See Section 5

Toxicity Data Ref. (1), (2)	Classification (Poison, Irritant, Etc.)
LCLoInhalation (rat) - 8,000 ppm/4 hour	Inhalation: Toxic
LD ₅₀ Dermal	Skin/Eye: Liquid mildly irritant to skin; eye irritant.
LD ₅₀ Ingestion (rat) - 4,900 - 7,000 mg/kg	Ingestion: Slightly to moderately toxic
Fish, LC ₅₀ (Lethal Concentration) Not Determined	Aquatic:

Human Exposure Information/Data: Unconfirmed data exists which indicate that trichloroethylene by ingestion may be more toxic to humans than indicated by the available animal data. Such unconfirmed data report poisonings at doses as low as 50 mg/kg.

24-HOUR EMERGENCY ASSISTANCE: (313) 358-5800

Section 4 (Cont'd) - Permissible Exposure Limits

Current OSHA permissible exposure limits (29CFR 1910.1000) are 100 ppm (8-hour TWA);
100-200 ppm periodic excursions are allowed providing 8-hour TWA is at or below 100 ppm;
200-300 ppm excursions allowed only for maximum of 5 minutes in any 2-hour period;
300 ppm maximum allowable concentration (must not be exceeded).

SECTION 5 • EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

Acute: Irritant and central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and, if exposed at high concentrations in confined or poorly ventilated areas, even death. Fatalities following severe acute exposure at high concentrations have been attributed to ventricular fibrillation resulting in cardiac failures.³

Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

Chronic: Prolonged exposure above the OSHA permissible exposure limits may result in liver and kidney damage. Trichloroethylene has been extensively studied for cancer both in the U.S. and Europe by government, industry and academia. There is no documented evidence that Trichloroethylene causes an increased cancer incidence in humans.

EMERGENCY AND FIRST AID PROCEDURES:

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

Eye or Skin Contact: Flush eyes and skin with plenty of water (soap and water for skin) for at least 15 minutes, while removing contaminated clothing and shoes. If irritation occurs, consult a physician.

Ingestion: If conscious, drink a quart of water. DO NOT induce vomiting. Take immediately to a hospital or physician. If unconscious, or in convulsions, take immediately to a hospital or physician. DO NOT give anything by mouth to an unconscious person.

Notes to Physician (Including Antidotes): NEVER administer adrenalin following trichloroethylene overexposure. Increased sensitivity of the heart to adrenalin may be caused by overexposure to trichloroethylene.

SECTION 6 . REACTIVITY DATA

Stability: Stable	Conditions to Avoid: Avoid open flames, hot glowing surfaces or electric arcs.
Hazardous Polymerization: Will not occur	Conditions to Avoid: None

Incompatibility (Materials to Avoid): Avoid contamination with caustic soda, caustic potash or oxidizing materials. Shock sensitive explosives may be formed.
See Detrex warning letter Form Sol 8208.21 attached.

Hazardous Decomposition Products: Hydrogen chloride and possibly traces of phosgene.

SECTION 7 . SPILL OR LEAK PROCEDURES (See Detrex Forms Sol 8208.14 and Sol 8208.15 attached)

Steps to be Taken if Material is Spilled or Released: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. DO NOT flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc., as necessary and place in closed containers for disposal.
(See Below)

Waste Disposal Method: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility.⁷ Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act and all relevant state or local laws/regulations regarding disposal of hazardous waste.

SECTION 8 • SPECIAL PROTECTION INFORMATION

Respiratory Protection: For emergencies or working in confined areas, wear self-contained breathing apparatus or supplied air respiratory protection (use "buddy system", also use harness and lifeline). In other circumstances involving potential overexposures, use NIOSH/MSHA-approved organic vapor respirator. (Observe limitations directed by manufacturer.) Respiratory protection program must be in accordance with 29CFR 1910.134.

Ventilation (Type): Mechanical (General) - Sufficient to maintain workplace concentration below permissible exposure limits.

Eye Protection: Splashproof goggles.

Gloves: Polyethylene, neoprene or polyvinyl alcohol

Other Protective Equipment: Safety shower and eye-wash fountain in immediate area. Personnel protective clothing and use of equipment must be in accordance with 29CFR 1910.133 and 29CFR 1910.132.

SECTION 9 • SPECIAL PRECAUTIONS

Precautions to be Taken During Handling and Storing:

- Do not use in poorly ventilated or confined spaces.
- Trichloroethylene vapors are heavier than air and will collect in low areas. Keep container closed when not in use.
- Do not store in open, unlabeled or mislabeled containers.
- Liquid oxygen or other strong oxidants may form explosive mixtures with trichloroethylene
- This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and traces of phosgene.
- AVOID CONTAMINATION OF WATER SUPPLIES: Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

Other Precautions:

- AVOID PROLONGED OR REPEATED BREATHING OF VAPORS. High vapor concentrations can cause dizziness, unconsciousness or death. Long term overexposure may cause liver/kidney injury.
- USE ONLY WITH ADEQUATE VENTILATION. Ventilation must be sufficient to limit employee exposure to trichloroethylene in work area at or below OSHA permissible exposure limits (8-hour TWA - 100 ppm; ceiling - 200 ppm; maximum peak - 300 ppm, 5 minutes in every 2 hours). Observance of lower limits (outlined in Section 4) is advisable.
- AVOID CONTACT WITH EYES. Will cause irritation and pain.
- AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. May cause irritation or dermatitis.
- DO NOT TAKE INTERNALLY. Swallowing may cause injury or death.
- DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.

References:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978
2. Industrial Hygiene and Toxicology, Volume II, Second Edition, F. A. Patty, 1963
3. Dangerous Properties of Industrial Materials, Fifth Edition, N. I. Sax, 1979
4. Industrial Toxicology, Hamilton and Hardy, 1974
5. Toxicity and Metabolisms of Industrial Solvents, Browning, 1965
6. Toxicology, the Basic Science of Poisons, Casarett and Doull, 1975
7. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980
8. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980

Comments:

As this solvent (trichloroethylene) is used primarily to clean and/or degrease a wide variety of metal and plastic parts, it should always be used in conjunction with properly designed and fully controlled solvent vapor degreasing equipment that is in compliance with the U.S. Environmental Protection Agency, OAQPS Guidelines, "Control of Volatile Organic Emissions from Solvent Metal Cleaning", and/or all other applicable federal, state or local regulatory guidelines.

Material Safety Data Sheet

MSD 8208.23

DETREX CHEMICAL INDUSTRIES, INC.
P.O. BOX 801
DETROIT, MICHIGAN 48232



Approved by U.S. Dept. of Labor as "Essentially similar" to Form OSHA-20

Date:	Edition:
Chemical Name and Synonyms: Methylene Chloride; dichloromethane CAS No.: 75-09-2	Trade Name and Synonyms: Methylene Chloride
Chemical Family: Halogenated Hydrocarbons	Formula: CH ₂ Cl ₂
DOT Shipping Name: Methylene Chloride	DOT Hazard Class: ORM-A - UN 1593

SECTION 1 - PHYSICAL DATA

Boiling Point @ 760 mm Hg: 103.6°F (39.8°C)	Vapor Density (Air=1): @ 20°C = 2.93	Specific Gravity (H ₂ O=1): 1.32	pH of Solutions: Neutral
Freezing/Melting Point: -142.1°F (-96.7°C)	Solubility (Weight % in Water): 2g/100 ml	Bulk Density: @ 20°C 11.15 lbs./gal.	Volume % Volatile: Essentially 100
Vapor Pressure: @ 20°C = 349 mmHg	Evaporation Rate (ethyl ether = 1): 0.71	Heat of Solution: Not Applicable	Appearance and Odor: Clear, colorless liquid with ether-like odor.

SECTION 2 - HAZARDOUS INGREDIENTS

	%	Hazard Data
Methylene Chloride (Stabilized)	100	See Sections 4 and 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

Flash Point °F (Method Used) None when tested in accordance with DOT requirements.	Flammable Limits in Air (% by Volume) See Below LEL: 12% UEL: 19%	Extinguishing Media: For fires involving methylene chloride, use water, dry chemicals or CO ₂ .
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Special Fire Fighting Procedures: Fire fighters should wear NIOSH/MSHA-approved, self-contained breathing apparatus for possible exposure to hydrogen chloride and possible traces of phosgene.

Unusual Fire and Explosion Hazards: Vapors concentrated in a poorly ventilated area can be ignited upon contact with a spark, flame or high intensity source of heat. This can occur at concentrations between 12% and 19% by volume. Decomposition or burning can produce hydrogen chloride and possibly traces of phosgene. Also see Detrex warning letter Form Set 8208.21 attached.

SECTION 4 - HEALTH HAZARD DATA

Permissible Exposure Limits (TLV): 500ppm (TWA) See Section 4 (Cont'd) next page

Toxicity Data	Classification (Poison, Irritant, Etc.)
LC ₅₀ Inhalation LC ₅₀ (guinea pig) 5,000ppm/2hrs. TCLO ^a (human) 500ppm/8hrs.	Inhalation: Toxic
LD ₅₀ Dermal	Skin/Eye: Liquid mildly irritating to skin; eye irritant.
LD ₅₀ Ingestion - (rat) = 2.136g/kg	Ingestion: Slightly toxic
Fish LC ₅₀ (Lethal Concentration) Not determined	Aquatic:

Human Exposure Information/Data:

^a Lowest published toxic concentration.

24-HOUR EMERGENCY ASSISTANCE: (313) 358-5800

Section 4 (cont'd) - Permissible Exposure Limit

Current OSHA permissible exposure limits (29CFR 1910.1000) are 500 ppm (8-hour TWA); 500-1,000 ppm period excursions are allowed providing TWA is at or below 500ppm; 1,000-2,000ppm excursions allowed only for maximum of five minutes in any 2-hour period -- 2,000ppm maximum allowable concentration (must not be exceeded).

*NIOSH recommends that the TWA exposure limit for methylene chloride is 75ppm. In the absence of occupational exposure to carbon monoxide (CO) above a TWA of 9ppm up to a 10-hour workday, occupational exposure to methylene chloride shall be controlled so that workers are not exposed to methylene chloride in excess of 75ppm (261 mg/cu m) determined as a TWA for up to a 10-hour workday, 40-hour workweek. In the presence of exposure to CO in the work environment at more than 9ppm as a TWA for up to a 10-hour workday, exposure limits of CO or methylene or both shall be reduced to satisfy the relationship:

$$\frac{C(\text{CO})}{L(\text{CO})} + \frac{C(\text{CH}_2\text{Cl}_2)}{L(\text{CH}_2\text{Cl}_2)} \leq 1$$

where: C(CO) = TWA exposure concentration of CO, ppm

L(CO) = the recommended TWA exposure limit of CO = 9ppm

C(CH₂Cl₂) = TWA exposure concentration of methylene chloride, ppm

L(CH₂Cl₂) = the recommended TWA exposure limit of methylene chloride = 75ppm

Occupational exposure shall be controlled so that workers are not exposed to methylene chloride above a peak concentration of 500ppm (1,740 mg/cu m) as determined by a 15-minute sampling period.

Employees working with methylene chloride should be aware of this hazard. This toxic effect is "additive" in nature with the risk being greater for smokers, who generally have higher levels of carboxyhemoglobin. Employees with a history of cardiovascular disease should not be allowed to work with methylene chloride unless approved by a physician.

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure in the order of the most hazardous and the most likely route of overexposure.

Effects of Overexposure *

Acute: Inhalation effect is primarily narcosis. Principal symptoms may be headache, dizziness, nausea, tingling or numbness of the extremities, senses of fullness in the head, sense of warmth, stupor or dullness, lethargy and drunkenness. Exposure to very high concentrations may lead to unconsciousness or even death in confined or poorly ventilated areas.

Chronic: Several chronic inhalation studies reported by NIOSH revealed that test animals exposed to methylene chloride concentrations as high as 10,000ppm, showed slight liver and kidney changes. The results of these studies indicate that prolonged exposure limits may result in liver and kidney damage.

Chronic inhalation studies, cosponsored by several methylene chloride producers, were recently completed on rats. The results of these studies were reported to have revealed a mathematically significant increase in malignant salivary gland tumors in the group of male rats from the study's highest exposure level (3,500ppm).

Liquid splashed in the eyes can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

Research has recently shown that methylene chloride is metabolized by the body to carbon monoxide.⁴ Further, the amount of carbon monoxide formed is directly related to the amount of methylene chloride absorbed and can be sufficient to produce a substantial stress on the cardiovascular system through the elevation of the level of carboxyhemoglobin (COHb) -- the product formed by the combination of carbon monoxide and the blood's hemoglobin thus effectively reducing the amount of hemoglobin available for the transport of oxygen throughout the body.

EMERGENCY AND FIRST AID PROCEDURES:

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

Eye or Skin Contact: Flush eyes and skin with plenty of water (soap and water for skin) for at least 15 minutes, while removing contaminated clothing and shoes. If irritation occurs, consult a physician.

Ingestion: If conscious, drink a quart of water. DO NOT induce vomiting. Take immediately to a hospital or physician. If unconscious, or in convulsions, take immediately to a hospital or physician. DO NOT give anything by mouth to an unconscious person.

Notes to Physician (Including Antidotes): NEVER administer adrenalin following methylene chloride overexposure. Increased sensitivity of the heart to adrenalin may be caused by overexposure to methylene chloride.

SECTION 6 - REACTIVITY DATA

Stability:	Stable	Conditions to Avoid:	Avoid open flames, hot glowing surfaces or electric arcs.
Hazardous Polymerizations:	Will not occur	Conditions to Avoid:	None
Incompatibility (Materials to Avoid): Avoid contamination with caustic soda, caustic potash or oxidizing materials. Shock sensitive explosives may be formed. Avoid contact with aluminum, magnesium, zinc and alloys thereof under high pressures. See Detrex warning letter Form Sol 8208.21 attached.			
Hazardous Decomposition Products: Hydrogen chloride and possibly traces of phosgene.			

SECTION 7 - SPILL OR LEAK PROCEDURES (See Detrex Forms Sol 8208.14 and Sol 8208.15 attached)

Steps to be Taken if Material is Spilled or Released: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. DO NOT flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc., as necessary and place in closed containers for disposal. (See Below).

Waste Disposal Method: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act and all relevant state or local laws/regulations regarding disposal.

SECTION 8 • SPECIAL PROTECTION INFORMATION

Respiratory Protection: For emergencies or working in confined areas, wear self-contained breathing apparatus or supplied air respiratory protection. (Use the "buddy system" and wear a safety harness with lifeline). In other circumstances involving potential overexposures, use NIOSH/MSHA-approved organic vapor respirator. (Observe limitations directed by manufacturer.) Respiratory protection program must be in accordance with 29CFR 1910.134.

Ventilation (Type): Mechanical (General) - Sufficient to maintain workplace concentration below permissible exposure limits.

Eye Protection: Splashproof goggles

Gloves: Polyethylene, neoprene or polyvinyl alcohol.

Other Protective Equipment: Safety shower and eye-wash fountain in immediate area. Personnel protective clothing and use of equipment must be in accordance with 29CFR 1910.133 and 29CFR 1910.132.

SECTION 9 • SPECIAL PRECAUTIONS

Precautions to be Taken During Handling and Storage:

- Do not use in poorly ventilated or confined spaces.
- Methylene chloride vapors are heavier than air and will collect in low areas.
- Keep container closed when not in use.
- Do not store in open, unlabeled or mislabeled containers.
- Liquid oxygen or other strong oxidants may form explosive mixtures with methylene chloride.
- This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and traces of phosgene.
- **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage, and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.
- Caution should be taken not use in pressurized or totally enclosed system of light metal construction such as aluminum, magnesium, zinc or alloys thereof. Example, paint or adhesive spray system. (See form Sol. 8208.21 attached.)

Other Precautions:

- AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death. Long-term overexposure may cause liver/kidney damage.
- **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to methylene chloride below OSHA permissible exposure limits (8-hour TWA - 500ppm; ceiling - 1,000ppm; maximum peak - 2,000ppm, 5 minutes in any 2 hours).
 - **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
 - **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
 - **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.

References:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978
2. Industrial Hygiene and Toxicology, Volume II, Second Edition, F.A. Patty, 1963
3. Dangerous Properties of Industrial Materials, Fifth Edition, N.I. Sax, 1979
4. Industrial Toxicology, Hamilton and Hardy, 1974
5. Toxicity and Metabolisms of Industrial Solvents, Browning, 1965
6. Toxicology, the Basic Science of Poisons, Casarett and Doull, 1973
7. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 53084, May 19, 1980
8. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980

Comments: As this solvent (methylene chloride) is used to clean and/or degrease a wide variety of metal and plastic parts, it should always be used in conjunction with properly designed and fully controlled solvent vapor degreasing equipment that is in compliance with the U.S. Environmental Protection Agency OAQPS Guidelines, "Control of Volatile Organic Emissions from Solvent Metal Cleaning", and/or all other applicable federal, state or local regulatory guidelines.

Methylene chloride is also used extensively in industry as a solvent, thinner, paint stripper, etc. It should always be used in conjunction with properly designed and fully controlled equipment that is in compliance with applicable federal, state and local regulatory guidelines.

Material Safety Data Sheet

MSD 3208.22

DETREX CHEMICAL INDUSTRIES, INC.
P.O. BOX 501
DETROIT, MICHIGAN 48232



Approved by U.S. Dept. of Labor as "Essentially similar" to Form OSHA-20

Date: August, 1982	Edition: First
Chemical Name and Synonyms: Perchloroethylene; tetrachloroethylene CAS No.: 127-18-4	Trade Name and Synonyms: DETREX PERK, Perchlor, Perchloroethylene
Chemical Family: Halogenated Hydrocarbons	Formula: $\text{CCl}_2=\text{CCl}_2$
DOT Shipping Name: Tetrachloroethylene	DOT Hazard Class: ORM-A-UN1897

SECTION 1 • PHYSICAL DATA

Boiling Point @ 760 mm Hg: 250°F 121°C	Vapor Density (Air=1): 5.83	Specific Gravity ($\text{H}_2\text{O}=1$): (20°/20°C) 1.6	pH of Solutions: 6.8 to 8.4
Freezing/Melting Point: -8.2°F -22.3°C	Solubility (Weight % in Water): @25°C 0.015%	Bulk Density: 13.6 lbs./gal. @ 20°C	Volume % Volatile: Essentially 100
Vapor Pressure: @ 20°C = 14.2mmHg	Evaporation Rate (ethyl ether=1): 0.09	Heat of Solution: Not Applicable	Appearance and Odor: Clear, colorless liquid with ether-like odor.

SECTION 2 • HAZARDOUS INGREDIENTS

	%	Hazard Data
Perchloroethylene (Stabilized)	100	See Sections 4 & 5

SECTION 3 • FIRE AND EXPLOSION HAZARD DATA

Flash Point °F (Method Used) None	Flammable Limits in Air (% by Volume) None LEL: UEL:	Extinguishing Media: For fires involving perchloroethylene, use water, dry chemical or carbon dioxide.
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Special Fire Fighting Procedures: Fire fighters should wear pressure-demand self-contained breathing apparatus for possible exposure to hydrogen chloride and possible traces of phosgene.

Unusual Fire and Explosion Hazards: Perchloroethylene involved in fires can decompose to hydrogen chloride and possible traces of phosgene. See Detrex warning letter Form SoL 3208.21 attached.

SECTION 4 • HEALTH HAZARD DATA

Permissible Exposure Limits (TLV): See Section 5

Toxicity Data Ref. (1)	Classification (Poison, Irritant, Etc.)
LCLoInhalation (rat) 4,000 ppm (4 hours)	Inhalation: Moderately Toxic
LD ₅₀ Dermal	Skin/Eye: Liquid mildly irritating to skin; eye irritant
LD ₅₀ Ingestion (rabbit) - 5,000 mg/kg	Ingestion: Slightly Toxic
Fish, LC ₅₀ (Lethal Concentration) 96hr. TLM 100-10 ppm	Aquatic: Toxic

Human Exposure Information/Data: Unconfirmed data exists which indicate that perchloroethylene by ingestion may be more toxic to humans than indicated by the available data. Such unconfirmed data report poisonings at doses as low as 500 mg/kg.

24-HOUR EMERGENCY ASSISTANCE: (313) 358-5800

Section 4(Cont'd)- Permissible Exposure Limits

Current OSHA permissible exposure limits (29CFR 1910.1000) are 100 ppm (8-hour TWA);
100-200 ppm periodic excursions are allowed providing 8-hour TWA is at or below 100 ppm;
200-300 ppm excursions allowed only for maximum of 5 minutes in any 3-hour period;
300 ppm maximum allowable concentration (must not be exceeded).

SECTION 5 • EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

Acute: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and if exposed to high concentrations in confined or poorly ventilated areas, even death.

Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

Chronic: Prolonged exposure above the OSHA permissible exposure limits may result in liver and kidney damage. Perchloroethylene has been extensively studied for cancer both in the U.S. and Europe by government, industry and academia. There is no documented evidence that perchloroethylene causes an increased cancer incidence in humans.

EMERGENCY AND FIRST AID PROCEDURES:

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

Eye or Skin Contact: Flush eyes and skin with plenty of water (soap and water for skin) for at least 15 minutes, while removing contaminated clothing and shoes. If irritation occurs, consult a physician.

Ingestion: If conscious, drink a quart of water. DO NOT induce vomiting. Take immediately to a hospital or physician. If unconscious, or in convulsions, take immediately to a hospital or physician. DO NOT give anything by mouth to an unconscious person.

Notes to Physician (Including Antidotes): NEVER administer adrenalin following perchloroethylene overexposure. Increased sensitivity of the heart to adrenalin may be caused by over-exposure to perchloroethylene.

SECTION 6 . REACTIVITY DATA

Stability: Stable	Conditions to Avoid: Avoid open flames, hot glowing surfaces or electric arc.
Hazardous Polymerization: Will not occur	Conditions to Avoid: None

Incompatibility (Materials to Avoid): Avoid contamination with caustic soda, caustic potash or oxidizing materials. Shock sensitive explosives may be formed. Also see Detrex warning letter Form SoL 8208.21 attached.

Hazardous Decomposition Products: Hydrogen chloride and possibly traces of phosgene.

SECTION 7 . SPILL OR LEAK PROCEDURES (See Detrex Forms SoL 8208.14 and SoL 8208.15 attached)

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Waste Disposal Method:

Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act and all relevant state or local laws/regulations regarding disposal.

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Ventilation (Type): Mechanical (General) - Sufficient to maintain workplace concentration below permissible exposure limits.

Eye Protection: Splashproof goggles

Gloves: Polyethylene, neoprene or polyvinyl alcohol.

Other Protective Equipment: Safety shower and eye-wash fountain in immediate area. Personnel protective clothing and use of equipment must be in accordance with 29CFR 1910.133 and 29CFR 1910.132.

SECTION 9 • SPECIAL PRECAUTIONS

Precautions to be Taken During Handling and Storage:

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- Methylene chloride vapors are heavier than air and will collect in low areas.
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- Caution should be taken not use in pressurized or totally enclosed system of light metal construction such as aluminum, magnesium, zinc or alloys thereof. Example, paint or adhesive spray system. (See form Sol 8208.21 attached.)

Other Precautions:

- AVOID PROLONGED OR REPEATED BREATHING OF VAPORS. High vapor concentrations can cause dizziness, unconsciousness or death. Long-term overexposure may cause liver/kidney damage.
- USE ONLY WITH ADEQUATE VENTILATION. Ventilation must be sufficient to limit employee exposure to methylene chloride below OSHA permissible exposure limits (8-hour TWA - 500ppm; ceiling - 1,000ppm; maximum peak - 2,000ppm, 5 minutes in any 2 hours).
 - AVOID CONTACT WITH EYES. Will cause irritation and pain.
 - AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. May cause irritation or dermatitis.
 - DO NOT TAKE INTERNALLY. Swallowing may cause injury or death.

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1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978
2. Industrial Hygiene and Toxicology, Volume II, Second Edition, F.A. Patty, 1963
3. Dangerous Properties of Industrial Materials, Fifth Edition, N.I. Sax, 1979
4. Industrial Toxicology, Hamilton and Hardy, 1974
5. Toxicity and Metabolisms of Industrial Solvents, Browning, 1965
6. Toxicology, the Basic Science of Poisons, Casaretti and Doull, 1975
7. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980
8. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980

Comments: As this solvent (methylene chloride) is used to clean and/or degrease a wide variety of metal and plastic parts, it should always be used in conjunction with properly designed and fully controlled solvent vapor degreasing equipment that is in compliance with the U.S. Environmental Protection Agency OAQPS Guidelines, "Control of Volatile Organic Emissions from Solvent Metal Cleaning", and/or all other applicable federal, state or local regulatory guidelines.

Methylene chloride is also used extensively in industry as a solvent, thinner, paint stripper, etc. It should always be used in conjunction with properly designed and fully controlled equipment that is in compliance with applicable federal, state and local regulatory guidelines.

DU PONT

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

Name:
Freon® TF Solvent
Freon® PCA

Chemical Family:
Halogenated Hydrocarbon

Synonyms:
Trichlorotrifluoroethane
R-113, FC-113

Formula:
CCl2FCClF2

CAS Name:
Ethane, 1,1,2-Trichloro-1,2,2-Trifluoro

CAS Registry No.
76-13-1

Manufacturer/Distributor:
E. I. du Pont de Nemours & Co. (Inc.)

Medical Emergency Phone:
(800) 441-3637

Address:
Freon® Products Division
Wilmington, DE 19898

Transportation Emergency Phone:
CHEMTREC (800) 424-9300

PHYSICAL DATA

Boiling Point(°F):	117.6	Percent Volatile by Volume:	100%
Density:	1.57 g/cc @/77°F	Vapor Pressure:	334mm Hg @/77°F
Vapor Density (Air = 1):	6.5	Solubility in H ₂ O:	0.02% by wt. @ 77°F
pH Information:	Neutral	Evaporation Rate (CCl ₄ = 1):	0.1
Form:	Liquid	Appearance:	Clear
Color:	Colorless	Odor:	Slight Ethereal Odor

HAZARDOUS COMPONENTS

Material(s):	Approximate % :
Trichlorotrifluoroethane	100

HAZARDOUS REACTIVITY

Stability:
Material is stable. However, avoid open flames and high temperatures.

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE. DATE 01-11-2001 BY 60322 UCBAW

Incompatibility:

Alkali or alkaline earth metals - powdered Al, Zn, Be, etc.

Decomposition:

This compound can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids - possible carbonyl halides.

Polymerization:

Will not occur

FIRE AND EXPLOSION DATA

Flash Point:
None

Method:
TOC

Autoignition Temperature:
Not Determined

Flammable Limits in Air, % by Vol.
Lower: Nonflammable
Upper: Nonflammable

Autodecomposition Temperature:
Not Determined

Fire and Explosion:

Drums may rupture under fire conditions. Decomposition may occur.

Extinguishing Media:
Nonflammable

Special Fire Fighting Instructions:

Self-contained breathing apparatus (SCRA) may be required if drums rupture and contents are spilled under fire conditions.

HEALTH HAZARD INFORMATION

Principal Health Hazards:

Inhalation: Vapor is heavier than air and can cause suffocation by reducing oxygen available for breathing. Breathing high concentrations of vapor may cause light-headedness, giddiness, shortness of breath, and may lead to narcosis, cardiac irregularities, unconsciousness or death. LC 50 Rats 52,000 ppm/4 hrs.

Note: In screening studies with experimental animals, exposure at approximately 5000 ppm (v/v) and above, followed by a large intravenous epinephrine challenge, has induced serious cardiac irregularities.

Skin: Not a corrosive or irritant after single contact; however, repeated liquid contact can cause defatting of the skin resulting in irritation. This material is poorly absorbed through the skin (Rabbit ALD >11,000 mg/kg).

Eye: Liquid contact can cause discomfort, usually no extended effect.

Oral: Although oral toxicity is low [LD 50 Rat 43000 mg/kg], ingestion of FC-113 is to be avoided.

Exposure Limits:

PEL (OSHA) 1,000 ppm

TLV® TWA (ACGIH) 1,000 ppm

Safety Precautions:

Avoid breathing vapors and prolonged skin exposure. Use only in well ventilated area.

First Aid:

Inhalation: Remove to fresh air, call a physician. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Do not give epinephrine or similar drugs.

Note to Physician: Because of a possible increased risk of eliciting cardiac dysrhythmias, catecholamine drugs, such as epinephrine, should be considered only as a last resort in life threatening emergencies.

Eye: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

Skin: Flush with water. Get medical attention if irritation is present.

Oral: No specific intervention is indicated as the compound is not likely to be hazardous by ingestion. However, consult a physician if necessary. Do not induce vomiting as the hazard of aspirating the material into the lungs is a greater hazard than allowing it to progress through the intestinal tract.

Medical Conditions Possibly Aggravated by Exposure:

Cardiovascular Disease: See Principal Hazards: Inhalation Section.

Other Health Hazards:

Freon® 113 is not listed as a carcinogen by IARC, NTP or OSHA. Based on animal studies and human experiences this fluorocarbon poses no hazard to man relative to systemic toxicity, carcinogenicity, mutagenicity, or teratogenicity when occupational exposures are below its TLV®.

PROTECTION INFORMATION

Generally Applicable Control Measures:

Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low places.

Personal Protective Equipment:

Butyl gloves should be used to avoid prolonged or repeated exposure. Chemical splash goggles should be available for use as needed to prevent eye contact. Under normal manufacturing conditions no respiratory protection is required when using this product. Self-contained breathing apparatus (SCBA) is required if a large spill occurs.

DISPOSAL INFORMATION

Spill, Leak or Release:

Ventilate area. Do not flush into sewers. Dike spill. Collect on absorbent material and transfer to steel drums for recovery or disposal. Comply with federal, state and local regulations on reporting releases.

Waste Disposal: Comply with federal, state and local regulations. Remove to a permitted waste disposal facility. EPA Hazardous Waste Nos. F001 and F002 may apply to waste materials.

SHIPPING INFORMATION

Domestic - Other Than Air (DOT)

Proper Shipping Name

Not Regulated

International Water or Air (IMO/ICAO)

Proper Shipping Name

Not Regulated

Other Information

Shipping Containers

Drums, tank trucks, tank cars

Storage Conditions

Clean, dry area. Do not heat

above 125°F.

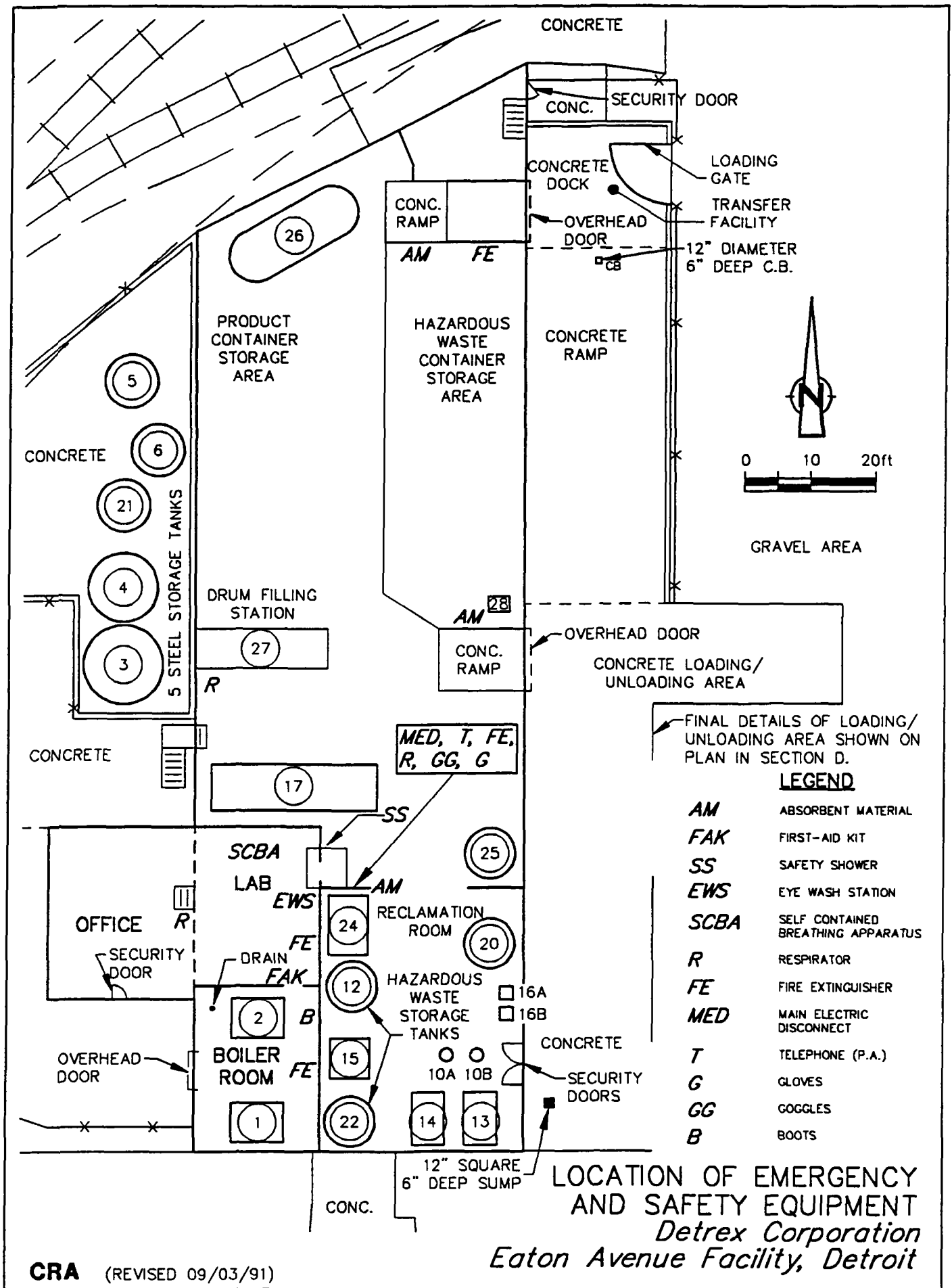
Date Revised: 10/85

Person responsible: T. D. Armstrong, C&P Dept., Freon® Products Lab,
Chestnut Run, Bldg. 711, Wilmington, DE 19898
(302) 999-3847 or (302) 999-4338.



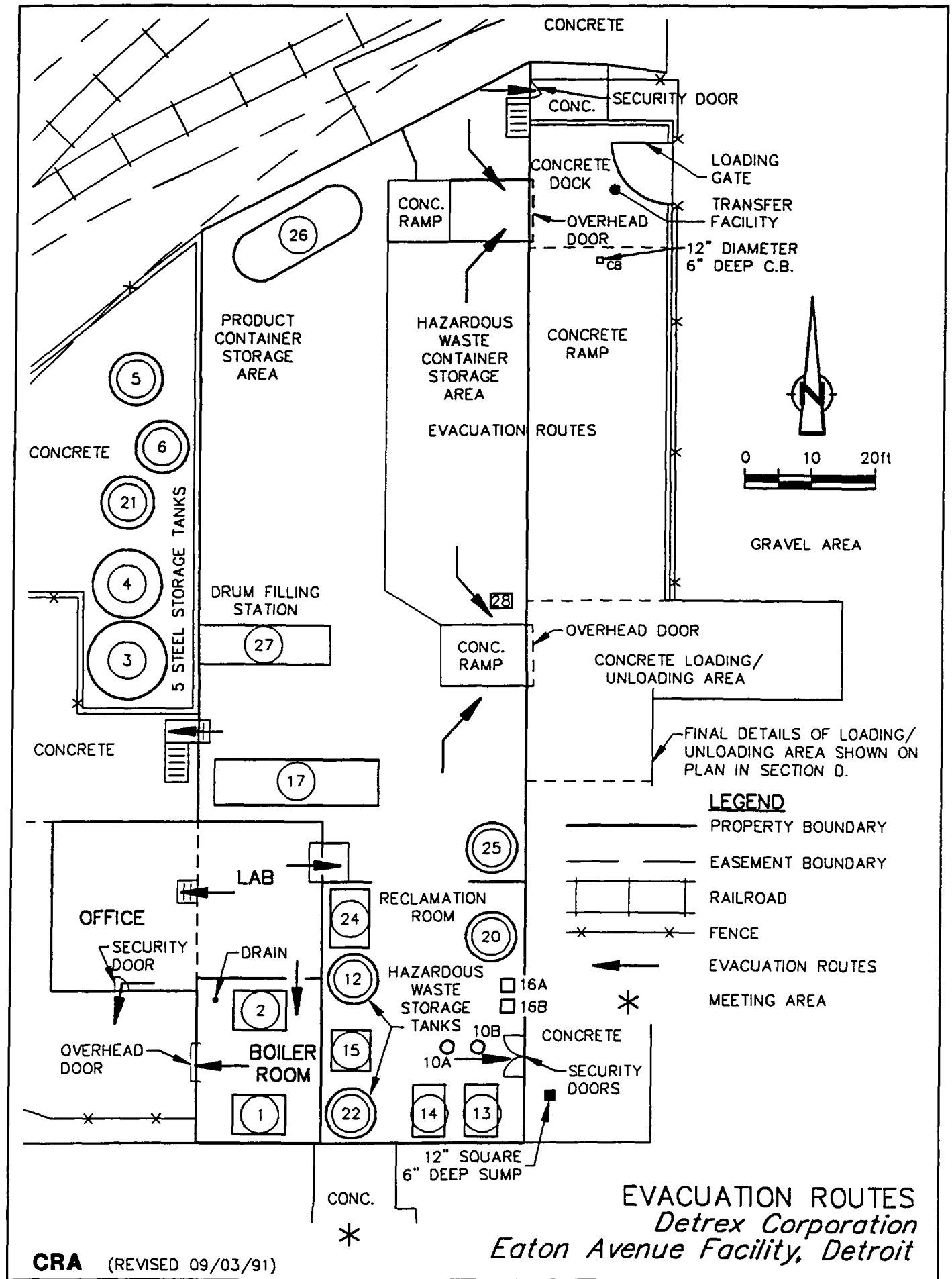
ATTACHMENT G-3

LOCATION OF EMERGENCY AND SAFETY EQUIPMENT



ATTACHMENT G-4

EXCAVATION ROUTES



Date: 06/24/91
Revision: 91-1
Page: H-1

SECTION H

PERSONNEL TRAINING

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PERSONNEL TRAINING

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 H-1b Training Content, Frequency, and Technique
 [40 CFR §264.16(c), and (d)(3)].....H-5
 H-1c Training Director [40 CFR §264.16(a)(2)].....H-6
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 H-1e Training for Emergency Response [40 CFR §264.16(a)(3)].....H-6

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 [40 CFR §264.16(b), and (d)(4)]H-7

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ATTACHMENT H-2	EMPLOYEE TRAINING PROGRAM
ATTACHMENT H-3	CURRICULA VITA - TRAINING DIRECTOR

SECTION H

PERSONNEL TRAINING

This section outlines the personnel training program completed by all employees of the Detrex Corporation facility in Detroit, Michigan. The information is provided pursuant to Michigan Act 64 Rule 299.9504(1)(c) which incorporates 40 CFR 270.14(b)(12) and 264.16 by reference. The applicable section(s) of the Federal Regulations (40 CFR) is referenced as appropriate.

H-1 OUTLINE OF TRAINING PROGRAM [40 CFR §264.16(a)(1)]

H-1a Job Titles/Job Description [40 CFR §264.16(d),(1) and (2)]

Detrex Corporation maintains the following documents and records at the facility:

- 1) The job title for each position related to hazardous waste management, and the name of the employee currently filling each job.
- 2) The written job description for each position as described in (1) above, which includes experience, skills and responsibilities. Job descriptions, a copy of which is provided in Attachment H-1, are kept on file in the plant office. The current employee's name is also recorded.
- 3) A written description of the type and amount of both introductory and continuing training given to personnel for each position related to hazardous waste management.
- 4) Records that document that the training and job experience have been completed by facility personnel.

Detrex Corporation maintain training records of former employees involved with hazardous waste management for three years from the date they last worked at the facility and will maintain training records on current personnel until closure of the facility.

**H-1b Training Content, Frequency, and Technique
[40 CFR §264.16(c), and (d)(3)]**

The program developed by Detrex Corporation for training employees in the safe handling of hazardous wastes includes study, on-the-job training, and competence evaluation. Provisions are made for updating or revising the training program as necessary to ensure compliance with regulatory guidelines, changing facility conditions, and organizational changes.

A copy of the Hazardous Waste Management Facility Employee Training Program Manual developed by Detrex is provided in Attachment H-2. This outlines all aspects of the training program, providing each employee with the information required for the safe execution of his or her responsibilities.

H-1c Training Director [40 CFR §264.16(a)(2)]

Mr. Bill Moore has been appointed Corporate Training Director for Detrex Corporation. For this role Mr. Moore will be responsible for updating the existing personnel training program and ensuring all employees involved in hazardous waste management activities receive adequate training. Mr. Moore himself has received formal training as described in his curricula vita enclosed as Attachment H-3. Additionally, the Training Director attends various meetings/seminars with Detrex Corporations' Risk Management Team. The purpose of these is to help keep the facility Training Director as up-to-date as possible on changing regulations that affect operations.

H-1d Relevance of Training to Job Position [40 CFR §264.16(a)(2)]

Contents of the training program is tailored to each position. The Gold Shield Operator #1 receives training in the operation of: Process Equipment, Filling Station, Safety Equipment, Transportation and Material Handling Equipment, Emergency Equipment, and Forklift and Hand Truck Operation, and on the Contents of the Contingency Plan.

The Emergency Coordinator receives training in the Operation, Inspection and Recordkeeping for: Process Equipment, Safety Equipment, Transportation and Material Handling Equipment and Contingency Plan Procedures.

All facility employees participated in annual refresher training sessions which review general operating procedures and in particular implementation of the Contingency Plan and related safety equipment.

H-1e Training for Emergency Response [40 CFR §264.16(a)(3)]

This training program is designed to ensure that personnel not only handle hazardous wastes in a safe manner, but also properly respond to emergency situations. The program trains hazardous waste handling/management personnel to maintain compliance under both normal operating conditions and emergency conditions.

H-2 IMPLEMENTATION OF TRAINING PROGRAM
[40 CFR §264.16(b), and (d)(4)]

An employee is hired to fill a specific position (i.e. Gold Shield Operator # 1). The employee is first required to review the written training program for the position he/she is to fill. Upon completion, the employee is then given 40 hours of on-the-job training within 1 month of hiring.

No employee hired to work at this facility will work unsupervised prior to completion of the training program.

Employees are required to meet annually for reviews and updates of this training program and to discuss and study the following subjects:

1. All hazardous wastes currently being handled at the facility, noting only changes in waste type, volume, source, characteristics, or location that have occurred during the past year;
2. The status of operating conditions and procedures, noting any areas where there are problems or potential for problems. Employees participate in developing effective solutions;
3. The requirements contained in the facility's operating license, noting any changes that have occurred during the past year. Areas where maintenance or compliance is a problem are identified and discussed, and effective solutions are sought; and
4. Incidents that have occurred in the past year that warranted use of contingency plans and/or emergency action. This review focuses on the cause of the incident and identification of steps to be taken to prevent or to ensure better handling of such events in the future.

Records documenting that the required training or job experience required to ensure that employees are trained to perform their duties in such a manner that compliance with the operating license is assured, will be kept onsite in the office. These records will be kept until closure of the facility for current employees and for 3 years from the date of the individual employee's termination for former employees. Records will include job description, employee name, training contents, date and duration of training and the instructor assessment of competency.

ATTACHMENTS

ATTACHMENT H-1

JOB DESCRIPTIONS

Personnel at Detroit Branch

Facilities Manager	Ronald C. Hritzkowin
Quality Control Coordinator	Joseph Calderoni
Administrative Assistant	Lorie LaRosa
Secretary	Barbara Hooper
Gold Shield Operator #1*	Levi Douglass
	Greg Seretian
	Richard Barmore
	Pat Walter

* Union Contract Job Title

TITLE: FACILITIES MANAGER

POSITION TITLE: FACILITIES MANAGER

1. Marketing Operations:

- (a) Attend solvent deliveries assuring weight, number and count and, in event of bulk receipts, that lading appears to meet quality specifications for color, moisture, and absence of suspended matter. Accept shipments in name of Detrex.
- (b) Attend loading of bulk shipments insuring that, if Detrex vehicle transport tank is clean and free of significant residue from previous loads in, if for hire or customer vehicle, transport tank is clean, dry, unblemished, and free of any residue. Execute shipping documents.
- (c) Supervise, assign, and direct employees involved in drumming operations. Inspect empty drums for suitability. Assure that drumming operation proceeds in a manner that preserves solvent quality and is performed according to good industrial practice respecting employees safety and protection of the environment. Assures are properly marked and in accordance with DOT regulations.
- (d) Supervise operation of warehouse. Schedule work of operators. Assure clean and orderly use of warehouse space.
- (e) Supervise private motor fleet and administer vehicle leases. Dispatch and route company drivers. Assure motor operations are performed according to regulations of USDOT and Michigan regulatory agencies. Read and retain driver logs and vehicle condition reports. Insure that company vehicles are properly maintained and serviced.
- (f) Recommend hiring of operators.

2. Environmental and Regulatory Responsibilities:

Has full responsibility for on-site hazardous waste management as follows:

- (a) Is the assigned Branch Emergency Coordinator.
- (b) Supervises all record keeping by Quality Control Coordinator, Administrative Assistant, or for hazardous waste manifests done by other branch personnel.
- (c) Supervises the Operators when any on-site sampling is performed.

- (d) Supervises the Quality Control Coordinator when on-site testing of hazardous waste is performed.
- (e) Supervises all record keeping of all daily and weekly facility inspection reports as performed by the Secretary, Administrative Assistant, or the Gold Shield operator.
- (f) Is the primary contact for all regulatory agency personnel in conjunction with Detrex Corporation Risk Management Group.
- (g) Responsible for maintaining training levels of all branch personnel
- (h) Has responsibility for all regulatory compliance in operation of the TSD facility.

3. General:

The incumbent reports to the Division Operations Manager and assists him/her as required. The incumbent performs some additional duties as the Division Operations Manager may direct.

4. Qualifications:

The incumbent should have at least 5 years experience in plant operations, including environmental and regulatory exposure. He/she must have a working knowledge of transportation operations. He/she must be sensitive to sales and marketing situations and be able to support the Sales/Marketing group as requested.

TITLE: QUALITY CONTROL COORDINATOR

POSITION RESPONSIBILITIES AND DUTIES:

Job Description:

Position is responsible for ensuring that the facility operates in accordance with Detroit Department of Water & Sewage, Wayne County Department of Health Air Pollution Control Division, and Corporate established product standards.

1. Primary Responsibilities:

- (a) Receive samples of hazardous waste at the facility, log in samples, complete waste sample profile sheets for samples, prepare samples for shipment to the appropriate analytical facility, logging in of analytical results, and dissemination of results to Salesmen.
- (b) Ensure that all shipments of non-flammable waste received at the facility are properly Manifested, labeled, marked with accumulation start date, sampled, logged into the Hazardous Waste Operating log, prepared for shipment to appropriate analytical facility or analytical results from generator/transporter are obtained, production control cards are prepared, and bench top fingerprint analysis are performed.
- (c) Ensure that all shipments of waste received at the facility are properly Manifested, labeled, marked with accumulation start date, labeled with Stream Code approval number, logged into the appropriate waste operating log, and coordinate shipments/pick-ups with drivers to allow for optimum use of equipment.
- (d) Coordinate treatment of waste water including supervision of treatment, subsequent sampling and disposal of effluent and filtered solids, shipment of samples and wastes, operation of waste water treatment process equipment, and the use and stocking of treatment chemicals.
- (e) Coordinate Air Monitoring Program including monitoring/sampling of influent and effluent from carbon absorption unit, logging in of results, operation of carbon absorption unit, stocking of materials for use in unit, and coordination of monitoring program with Wayne County Department of Health, Air Pollution Control Division.

2. Secondary Responsibilities:

- (a) Completion of Production Control cards for invoicing crediting of customers.

- (b) Conducting titration for non-amine acceptance of reclaimed solvents, calculating amount of stabilizer concentrate is required in reclaimed solvent, and stocking of chemicals required for N.A.A. tests and test kits.
- (c) Logging in production figures and shipment information, including completed manifests and certificates of destruction from TSDF's into hazardous and appropriate waste log books. Also responsible for assimilating data required and for putting together certificates of destruction and sending same to customers.

3. Regulatory Responsibilities:

In addition to the above mentioned, the following regulatory responsibilities shall be undertaken by the position:

- (a) Maintain a file for Import and Export shipments of hazardous wastes for the current year. This data shall be compiled at the end of the year and used to complete the Import/Export Annual Report. The report shall be filed with the U.S.E.P.A. and M.D.N.R. and other parties requiring it not later than the end of the first calendar week of the proceeding year.
- (b) Obtain samples of the effluent from the facility in a timely fashion each quarter of the year. The samples shall be forwarded to an independent laboratory for City of Detroit Water Analysis. Once the analytical results are received, the data shall be utilized to create the six month compliance report for the facility. The report shall be forwarded to the facility manager for timely review and submission to the City of Detroit.

Salary and performance reviews shall be given annually in January. The reviews shall use as a basis of performance the efficiency of completion of the above mentioned tasks as pertaining to the position.

4. Qualifications:

The incumbent should have, or be working toward, a degree in Chemistry (or equivalent). The incumbent should have at least 2 years of experience with laboratory and analytical procedures, preferably in an industrial situation. Experience in Hazardous Waste sampling and manifesting is preferred but not necessary. The incumbent should be able to work without close supervision, handling multiple assignments/projects.

TITLE: ADMINISTRATIVE ASSISTANT

POSITION RESPONSIBILITIES AND DUTIES

1. Primary Responsibilities:

- (a) Typing and mailing quotations and correspondences to customers for hazardous waste management services.
- (b) Receiving and maintaining quotation file from disposal facility for customer waste streams. Includes copying of original quotes and distribution to operations and sales personnel.
- (c) Taking phone orders for hazardous waste management services from customers and sales personnel and coordinating shipments/pick-ups with operational personnel.
- (d) Generating non-solvent sales and hazardous waste management services invoices, maintenance of non-solvent sales account file and non-solvent sales accounts receivable ledger and collections and maintenance of customers log summaries and generating invoices for surcharges.

2. Secondary Responsibilities:

- (a) Maintaining Solvent sales ledger and monthly sales summary file.
- (b) Logging vendor invoices in approved invoice file after Facility Manager has approved invoice for payment.
- (c) Maintaining file of hazardous waste processing batch cards from other Detrex branches and completing reclamation reallocation reports.
- (d) Compiling and publishing non-solvent sales month end report.
- (e) Coordinating Telemarketing activities with Sales Personnel.

3. Qualifications

Must be able to operate five line telephone system, be able to type 50-60 wpm, type correspondences from a Dictaphone, and use a ten key adding machine. Shorthand and personal computer operational skills are considered helpful but not necessary currently.

TITLE: SECRETARY

Position Responsibilities and Duties:

1. Primary Responsibilities:

- (a) Does billing for both resale materials and reclaimed product; does all invoicing for Hazardous Waste disposal; and tolling.
- (b) Keeps records of accounts payable and receivable.
- (c) Responsible for inventory control.
- (d) Does mailing and correspondence.
- (e) Schedules delivery runs.
- (f) Fills out shipping forms, keeps records of shipping and receiving.
- (g) Completes outbound hazardous waste manifests.
- (h) Answers phones and processes paperwork on orders.

2. Qualifications

Must be able to operate five line telephone system, be able to type 50-60 wpm, type correspondences from a Dictaphone, and use a ten key adding machine. Shorthand and personal computer operational skills are considered helpful but not necessary currently.

TITLE: GOLD SHIELD OPERATOR #1

Position Responsibilities and Duties:

1. Requisite Skills and Education:

- (a) Knowledge of streets in major cities in Southeast Michigan and Northwest Ohio.
- (b) Common knowledge of the mechanical operations of all mobile equipment.
- (c) Must have a valid chauffeur's licence and abide by governmental rules and regulations.
- (d) Must know the mechanical condition of the truck and report any defects.
- (e) Must pass DOT oral and written tests which will be scored by an impartial party.
- (f) Must pass DOT physical.
- (g) Must have respectable driving record. The Company's Risk Management Group will review the driving record or truck driver applications. Their decision to reject an applicant based on a poor driving record will be considered final and binding.
- (h) Must pass a driving test on Detrex equipment which will be evaluated by an impartial party.
- (i) Chauffeur's licence must be C-2 or better.
- (j) Will have successfully completed training at one of State of Michigan Community Development Programs; specifically, Hazardous Waste Industry Training and Technical Assistance programs.

**** Terminology as exists in Union Contract.**

- (k) Will have successfully completed driver testing and have been certified by Risk Management as outlined in the Code of Federal Regulations, part 49, section 390-392.
- (l) Will have a minimum of three (3) year's experience working with hazardous waste, including flammable and corrosive waste, or 6 calendar months on-the-job training involving working with these hazardous materials which will be considered probationary.

2. Performance:

- (a) Must be capable of driving any automobile equipment owned or leased by the Company.
- (b) Load and unload or assist in the loading or unloading of any vehicle owned or leased by the Company.
- (c) Will make bulk deliverables using 1) tank truck, 2) portable tank, 3) tank trailer, as required.
- (d) Will maintain all necessary log books when required as outlined in the Code of Federal Regulations, part 49, section 395.
- (e) Will make hazardous waste pickups using: 1) stake trailer, 2) tank trailer, 3) vacuum tank trailer, 4) vacuum pumper as required and according to Federal and State Laws.

3. Responsibility:

- (a) Responsible for the quality of workmanship.
- (b) Must produce a fair day's work for a fair day's pay.
- (c) Exercise due care of the various pieces of equipment while operating same.
- (d) Must operate the equipment in a safety manner. Keep the equipment and the area wherein the work is performed tidy at all times.
- (e) Responsible for implementing the transporters contingency plan in case of accidental spill of hazardous waste.
- (f) Responsible to see that hazardous waste labels on drums are filled out properly and include the proper UN/NA numbers according to DOT regulations.

- (g) Responsible for signing hazardous waste manifest on behalf of the Company that all information on manifest is correct and accurate.
- (h) Responsible for insuring Land Ban Certifications; form is included with "F" series manifested shipments.

When working in Solvents Reclamation Department

1. Operates Stills in reclamation room.
 - (a) Record weights of full drums.
 - (b) Record hydrometer reading.
 - (c) Record weight of empty drums.
 - (d) Take samples of solvents to be sent to lab for analysis.
 - (e) Drum reclaimed solvent.
2. Unload incoming shipments of solvents (drives forklift).
3. Load outgoing shipments.
4. Will have completed Clayton training on make-up water testing.
5. Will have completed training in Risk Management's spill prevention program.
6. Is knowledgeable on operation of all safety, equipment, SCBA, respirators, intercom, emergency disconnects, etc.
7. Is responsible for stacking drums three high into box van. Three (3) employees are required to do this job.,
8. Is responsible for daily and weekly inspections of the hazardous waste facility.

When working in Solvents Flammable Waste Transfer Station and/or Stabilizers Department

1. Responsible for insuring that all equipment is properly grounded before operations start.
2. Responsible for insuring that Stream Code Approval Number on Manifest is applied to containers before containers are placed on the trailer.

3. Responsible for insuring that shipments of flammable and/or corrosive waste correspond with information on manifest for the shipments.
4. Responsible for blending stabilizer concentrates using raw materials provided and established procedures as shown on batch cards.
5. Responsible for drumming and labeling batches of stabilizer concentrates.
6. Responsible completing Supplies Requisition forms including raw materials used after producing a batch of stabilizer concentrate.
7. Is responsible for daily and weekly inspections of the waste transfer station.

ATTACHMENT H-2

EMPLOYEE TRAINING PROGRAM

TRAINING PROGRAM

OVERVIEW

This facility primarily conducts on-the-job training programs. All new employees are familiarized with general/specific chemical hazards and instructed to perform their assigned tasks in a safe, efficient manner. Additional safety/product information is presented on a continual basis.

This facility operates essentially without detailed written job descriptions relying on a "standard operating procedures" approach. Employees are instructed/prepared for their assignments on a supervised, individual basis.

1. Job Titles and Duties

(a) Job Titles

An organization chart is presented for this reclamation and sales facility in Appendix 1. The titles of the personnel involved with hazardous waste management are:

Titles

Facilities Manager (Emergency Coordinator)
Quality Control Coordinator
Administrative Assistant
Secretary
Gold Shield Operator #1

There also are salaried sales employees who can be utilized for handling wastes and who assist in waste analyses.

Maintenance is performed by hourly employees trained to properly handle hazardous wastes.

(b) Duties

Detrex Corporation does not utilize detailed job descriptions for hourly employees or salaried sales employees. Rather, employees are assigned tasks similar to a given job title and are expected to perform those tasks in a safe and orderly fashion. The majority of training is "hands-on" the job directly related to an assigned position.

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The different job titles reflect the relative knowledge, skill, care, effort and responsibility required to perform the duties of the assigned job. All employees are aware of their assigned tasks and are offered sufficient instruction to safely accomplish them.

The written job descriptions for the personnel involved with hazardous waste management are maintained at the facility as well as a list of the current personnel filling each job.

2. Training Content, Frequency and Techniques

(a) Training Content

Detrex Corporation's employee training regarding the safe handling of hazardous wastes is initiated during the first week of employment. Appendix 2 presents a training outline developed by the Training Director. This training program also involves an orientation generally provided by the Training Director or Facility Manager:

<u>Attachment</u>	<u>Description</u>
Appendix 3	Clerical-Technical Orientation Checklist (if applicable)
Appendix 4	Hourly Orientation Checklist (if applicable)
Appendix 5	What To Do If You Get Chemicals Spilled On Various Parts Of Your Body

New employees are supervised until they are deemed competent by the branch manager for their assigned tasks.

As part of this program, employees are provided with a variety of written material. New employees receive copies of Section G (Contingency Plan) and appropriate portions of Section H (Personnel Training). Annual reviews contain information regarding regulatory changes, any implementations of the facility's contingency plan in the past year, and any changes in the facility's operating license. In addition, employees' questions and opinions are solicited and employees are, in turn, questioned to insure their comprehension.

Procedures for responding to emergencies are presented to employees on a general and a specific basis. As previously described, each

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employee receives, among other documents and training, a copy of the facility's contingency plan, as well as information regarding the type and location of alarm systems and emergency communication equipment. This emergency equipment is inspected on a regular basis (see schedules and inspection forms contained in Section F).

Persons responsible for operation of the hazardous waste drum storage area are trained in the proper storage requirements to avoid potential hazards, which are described more fully in Section F of this operating license application.

In the event of an emergency such as an explosion or fire, the specific procedures set forth in the contingency plan (with which employees are familiar through the training program) would govern. Documentation of this training program is maintained in the form of sheets signed by affected employees upon completion of the training session. These sheets are maintained with the facility's operating record.

(b) Frequency

The employee training program, as described in this document, is undertaken by all employees immediately upon their hiring by the facility.

In addition, all employees are required to meet, at a minimum, annually for reviews and updates of the training program. These reviews cover any and all changes in the operational or response procedures at the facility, past incidents that have caused the implementation of the contingency plan, and any changes to the operating license and/or Federal and State regulations that require an alteration to existing operational procedures.

(c) Technique

Detrex Corporation utilizes the plant environment for all employee orientation and on-the-job training.

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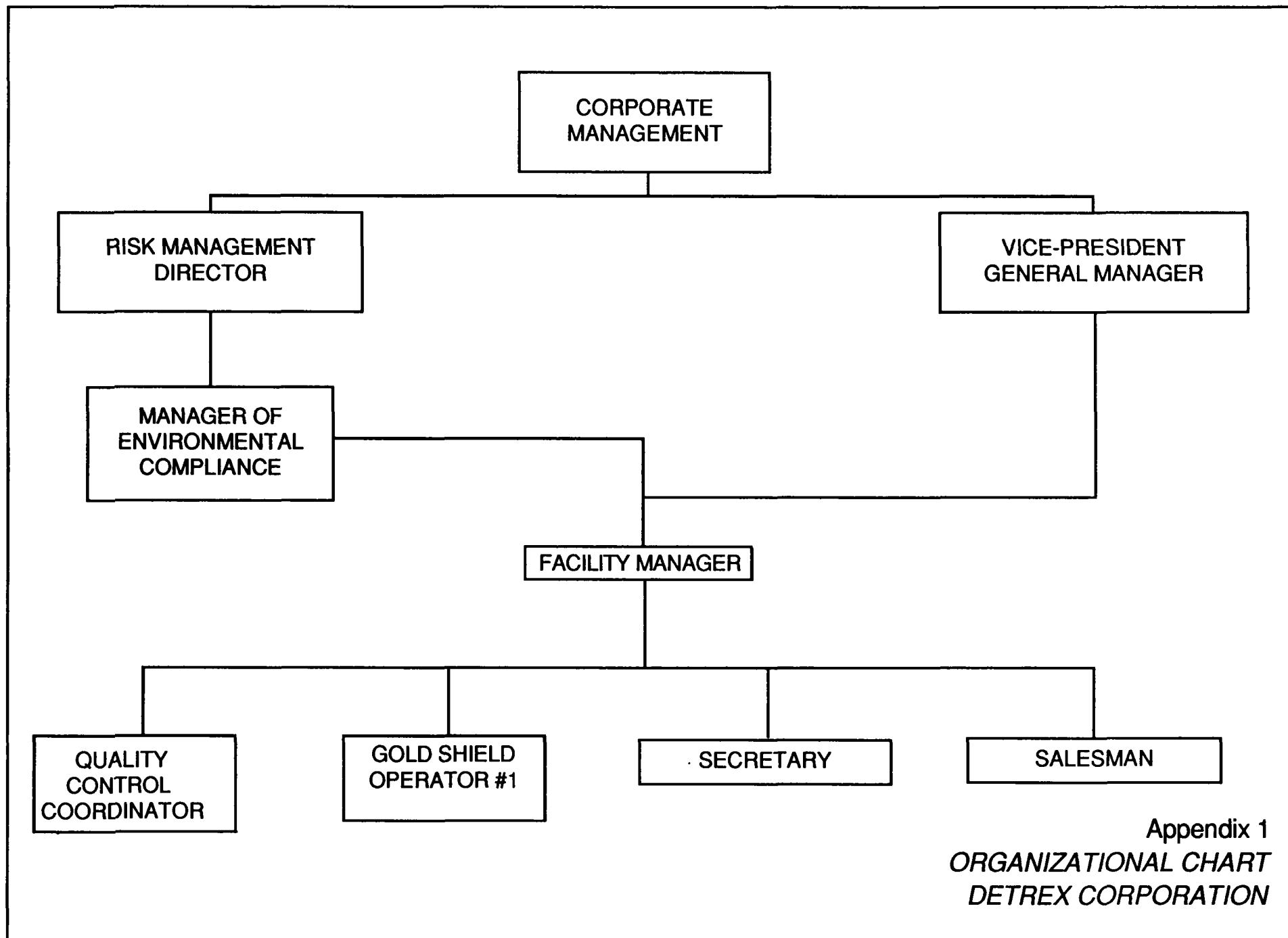
3. Training Direction and Implementation

All employees involved with hazardous waste management are trained by the Corporate Training Director and/or Facilities Manager/ Emergency Coordinator. All new personnel assigned to hazardous waste management tasks will complete the in-house training program within one (1) month of assignment to any hazardous waste management position. Employees will not perform assigned tasks unsupervised until training is complete.

Employees are required to meet annually for review/update of this training program. Their active participation is sought to maintain a valid program.

APPENDIX 1

ORGANIZATIONAL CHART



Appendix 1
ORGANIZATIONAL CHART
DETREX CORPORATION

APPENDIX 2

TRAINING DIRECTOR

TRAINING OUTLINE

Training Outline 40 CFR 264.16

I. Review of regulations regarding the transfer/disposal facility.

- A. 40 CFR 264 Federal Regulations
- B. State Regulations
- C. Hazardous Waste
 - 1. Definition
 - 2. Handling
 - a. Storage
 - b. Sampling
 - c. Transportation
 - 3. Manifesting
 - a. DOT
 - b. EPA
 - 4. Labeling
 - a. Drums
 - b. Storage area
 - c. 29 CFR 1910.1200 Requirements
 - 5. New Regulations
 - a. 24 Hour Phone Number
 - b. Emergency response Information
 - c. N.O.S. Items
 - d. Other

II. Facility operations

- A. Daily Inspection of equipment
- B. Inspection of Waste area, tanks, etc.
- C. Emergency cut-off systems
- D. Alarms or emergency call system
- E. Handling Drums
 - 1. Bungs
 - 2. Storage
 - 3. Other

III. Emergency Operations

- A. Contingency Plan implementation
- B. Fires
- C. Spills
 - 1. Containment
 - 2. Reporting
 - 3. Clean - up
 - 4. Releases
 - 5. Employee Protection
- D. Emergency Shut Down
- E. Notification

IV. Job Description

V. Transportation

- A. Driver Responsibility
- B. Check List
- C. Placarding
- D. DOT Regulations
- E. Areas of concern
 - 1. Proper Shipping Name
 - 2. Proper Waste Codes
 - 3. Handling Codes
 - 4. Discrepancies

APPENDIX 3

CLERICAL-TECHNICAL ORIENTATION CHECKLIST

CLERICAL-TECHNICAL ORIENTATION CHECKLIST

<i>Items to Cover</i>	<i>Key Points to Cover</i>	<i>Who Should Cover</i>	<i>When</i>	<i>Item Covered Initial Date</i>
Positive Attitude	<ul style="list-style-type: none"> - Assure employee that your role is to help him in his new job and that he should come to you for information and assistance. 	Supervisor	First Day	
Salary	<ul style="list-style-type: none"> - Advise employee of his starting salary and the job rate. - Explain that employee's performance will be reviewed periodically and, if satisfactory, his salary will be increased until the job rate is attained. If progress is not satisfactory, the employee will be told the reason and salary increases will be withheld until satisfactory performance is reached. - Inform employee of periodic adjustments in the salary ranges to keep salaries comparable with other area employers. - Explain overtime payment provisions. 	Supervisor	First Day	
Shop Rules of Conduct and Work Practices	<ul style="list-style-type: none"> - Give copy to employee. - Review each item with employee. - Stress importance of regular attendance and advance notice to the supervisor if absence is unavoidable. - Explain requirement to work reasonable overtime. - Instruct employee in the proper use and safeguarding of vehicles, tools and equipment. 	Supervisor	First Week	
Community "Right to Know"	<ul style="list-style-type: none"> - Discuss the contents of the manual, particularly the valuable source of specific toxic substance information in the Material Safety Data Sheet binders. - Review each item with the employee 	Supervisor	First Week	
Safety	<ul style="list-style-type: none"> - Explain Detrex's objective of production with no injuries, that all injuries can be prevented and that employee is to report any unsafe conditions and all injuries promptly to you. - Discuss fire and emergency procedures, including location of first aid facilities, fire extinguishers, etc. - Send employee to see the Emergency Coordinator for detailed instructions if the employee's job is potentially hazardous. 	Supervisor and Emergency Coordinator	First Day	

CLERICAL-TECHNICAL ORIENTATION CHECKLIST

<i>Items to Cover</i>	<i>Key Points to Cover</i>	<i>Who Should Cover</i>	<i>When</i>	<i>Item Covered Initial Date</i>
Equal Employment Opportunity	<ul style="list-style-type: none"> - Inform employee that Detrex does not discriminate and that Detrex bases clerical-technical personnel decisions on merit, qualifications, service and business needs. 	Supervisor	First Week	
Company Background	<ul style="list-style-type: none"> - Explain corporate operations, the number and location of facilities, the number of employees, etc. 	Supervisor	First Week	
Benefits	<ul style="list-style-type: none"> - Give employee a copy of "Employee Benefits Booklet". - Review the highlights of each plan, including the eligibility date, summary of the coverage, what the employee pays and what the Company pays. 	Supervisor	First Week	
Pollution Control	<ul style="list-style-type: none"> - Explain that Detrex must meet Federal and State laws and regulations pertaining to air, water and land purity. - Point out that the improper handling and disposition of chemicals can pollute the air, water and land and can have adverse impact on Detrex and on Detrex's employees. - Review the required actions to minimize pollution in the plant. - Give employee a copy of the <u>Annual Training and Orientation Checklist for Employees Regarding Hazardous Wastes</u>. Discuss the contents, specifically Detrex's intent to protect our environment through proper handling of hazardous wastes. 	Supervisor	First Week	
Energy Conservation	<ul style="list-style-type: none"> - Point out that Detrex's energy costs, like the employees, are constantly increasing and that Detrex welcomes any suggestions to reduce these energy costs. - Emphasize the need to conserve energy; e.g. heat, light, etc. 	Supervisor	First Week	
Employee Confidential and Proprietary Information Agreement	<ul style="list-style-type: none"> - Have employee read the entire Agreement and sign and return to the Supervisor the Employee's Agreement Form 	Supervisor	First Week	

CLERICAL-TECHNICAL ORIENTATION CHECKLIST

<i>Items to Cover</i>	<i>Key Points to Cover</i>	<i>Who Should Cover</i>	<i>When</i>	<i>Item Covered Initial</i>	<i>Date</i>
Acknowledgement of Orientation	- By signing below, the employee acknowledges that his supervisor and Personnel have covered the items listed above and that he intends to comply with the rules contained therein.	Supervisor	Second Week		

Employee's Signature

Date

Supervisor's Signature

Date

Personnel's Signature

Date

* Wherever his, him or he are used, the terms are meant to cover male and female.

DISTRIBUTION:

Original for employee's personnel folder in Payroll
Copy for employee's on-site personnel folder
Copy for employee

APPENDIX 4

HOURLY ORIENTATION CHECKLIST

HOURLY ORIENTATION CHECKLIST

<i>Items to Cover</i>	<i>Key Points to Cover</i>	<i>Who Should Cover</i>	<i>When</i>	<i>Item Covered Initial Date</i>
Positive Attitude	<ul style="list-style-type: none"> - Assure employee that your role is to help him in his new job and that he should come to you for information and assistance. 	Supervisor	First Day	
Salary	<ul style="list-style-type: none"> - Advise employee of his starting salary and the job rate. - Explain the timing and amount of progression increases and that progression increases will be withheld for unsatisfactory performance. - Inform employee of scheduled general and cost of living increases. - Explain overtime payment provisions. 	Supervisor	First Day	
Shop Rules of Conduct and Work Practices	<ul style="list-style-type: none"> - Give copy to employee. - Review each item with employee. - Stress importance of regular attendance and advance notice to the supervisor if absence is unavoidable. - Explain requirement to work reasonable overtime and on any shift. - Instruct employee in the proper use and safeguarding of vehicles, tools and equipment. 	Supervisor	First Week	
Community "Right to Know"	<ul style="list-style-type: none"> - Discuss the contents of the manual, particularly the valuable source of specific toxic substance information in the Material Safety Data Sheet binders. - Review each item with the employee. 	Supervisor	First Week	
Safety	<ul style="list-style-type: none"> - Explain Detrex's objective of production with no injuries, that all injuries can be prevented and that employee is to report any unsafe conditions and all injuries promptly to you. - Discuss fire and emergency procedures, including location of first aid facilities, fire extinguishers, etc. - Send employee to see the Emergency Coordinator for detailed instructions. 	Supervisor and Emergency Coordinator	First Day	

HOURLY ORIENTATION CHECKLIST

<i>Items to Cover</i>	<i>Key Points to Cover</i>	<i>Who Should Cover</i>	<i>When</i>	<i>Item Covered Initial Date</i>
Equal Employment Opportunity	<ul style="list-style-type: none"> - Inform employee that Detrex does not discriminate and that Detrex bases hourly personnel decisions on merit and seniority. 	Supervisor	First Week	
Company Background and Welcome	<ul style="list-style-type: none"> - Explain corporate operations, the number and location of facilities, the number of employees, etc. 	Supervisor	First Week	
Benefits	<ul style="list-style-type: none"> - Give employee a copy of "Employee Benefits Booklet". - Review the highlights of each plan, including the eligibility date, summary of the coverage, what the employee pays and what the Company pays. 	Supervisor	First Week	
Pollution Control	<ul style="list-style-type: none"> - Explain that Detrex must meet Federal and State laws and regulations pertaining to air, water and land purity. - Point out that the improper handling and disposition of chemicals can pollute the air, water and land and can have adverse impact on Detrex and on Detrex's employees. - Review the required actions to minimize pollution in the plant. - Give employee a copy of the <u>Annual Training and Orientation Checklist for Employees Regarding Hazardous Wastes</u>. Discuss the contents, specifically Detrex's intent to protect our environment through proper handling of hazardous wastes. 	Supervisor	First Week	
Energy Conservation	<ul style="list-style-type: none"> - Point out that Detrex's energy costs, like the employees, are constantly increasing and that Detrex welcomes any suggestions to reduce these energy costs. - Emphasize the need to conserve energy; e.g. heat, light, etc. 	Supervisor	First Week	

HOURLY ORIENTATION CHECKLIST

<i>Items to Cover</i>	<i>Key Points to Cover</i>	<i>Who Should Cover</i>	<i>When</i>	<i>Item Covered</i>	
				<i>Initial</i>	<i>Date</i>
Acknowledgement of Orientation	- By signing below, the employee acknowledges that his supervisor and Personnel have covered the items listed above and that he intends to comply with the rules contained therein.	Supervisor	Second Week		

_____ Employee's Signature	_____ Date
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_____ Supervisor's Signature	_____ Date
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_____ Personnel's Signature	_____ Date
--------------------------------	---------------

* Wherever his, him or he are used, the terms are meant to cover male and female.

DISTRIBUTION:

Original for employee's personnel folder in Payroll
Copy for employee's on-site personnel folder
Copy for employee

APPENDIX 5

WHAT TO DO IF YOU GET CHEMICALS SPILLED ON VARIOUS PARTS OF YOUR BODY

WHAT TO DO IF YOU GET CHEMICALS SPILLED ON VARIOUS PARTS OF YOUR BODY

1. Chemicals in the Eye

Splashes of irritant chemicals in the eye, or even exposure to vapor or mist of some chemicals, may lead to serious eye injury. Those who may be exposed to such chemicals should always use proper protective goggles or face shields.

Seconds count. First aid should be immediate, and consists of a thorough flushing of the eye with tap water, using eye bath fountain if available, a gentle stream of water from a hose, or any other means by which the eye may be freely flushed. Lids should be forcibly held apart so that the entire surface of the eye may be flushed. Under most circumstances this flushing should be continued for at least fifteen minutes. Contact lenses should not be worn in chemical laboratories because of the added difficulty they cause in eye irritation.

The patient should then be referred to a physician, preferably an ophthalmologist with experience in handling chemical burns of the eye. Neutralizing solutions should never be used for first aid, since experience has demonstrated that they often aggravate the injury. Ointments are not recommended for first aid use.

2. Chemicals on Body or Clothing

The primary consideration is the prompt removal of the chemical from contact with the skin. This is true whether or not the material has local action. All contaminated clothing should be removed at once, preferably under a shower, and the contacted areas freely flushed with water, preferably with plenty of soap, and under a shower or running water. If exposure has been severe, call a physician, telling him the location of the patient and chemical involved.

The copious use of water to remove as far as possible all traces of the chemical is the most available and effective first aid measure. This applies whether or not the material is water-soluble. Chemical antidotes, such as alkalis for acid contacts and vice versa, or solvents such as alcohol for phenol, should not be used as first aid measures.

After thorough removal of the chemical, the patient should be kept warm and preferably lying down. Further treatment should be as directed by the physician.

ATTACHMENT H-3

CURRICULA VITA - TRAINING DIRECTOR

William M. Moore Jr.
6245 Atkins Road
Troy, Michigan 48098
(313) 879-8817

Education/Training

Emergency Response Training Technician Level, EPA Region IV, Bowling Green, Kentucky, 1990 (Scheduled July 23-27)
Emergency Response Training, Bowling Green State Vocational School, 1989

University Of Toledo, Toledo Ohio
Hazardous Materials Chemistry, 1989

Western Kentucky University, Bowling Green, Kentucky
Certified Hazardous Materials Manager Training
1989

Oklahoma State University, Stillwater Oklahoma.
Environmental Audits- Preparation and Evaluation,
1988

Liberty Mutual Insurance Company, Hopkinton, Massachusetts, Hazard Communication and Chemical Control
1988

Liberty Mutual Insurance Company, Hopkinton, Massachusetts, Environmental Health Institute, 1986

Western Kentucky University, Bowling Green, Kentucky
M.A. Business Administration, 1974

Western Kentucky University, Bowling Green, Kentucky
B.S. Industrial/Mechanical Engineering Technology, 1974

Experience

March 1990
to Present
Detrex Corporation
Corporate Risk Management
Southfield, Michigan

Manager Environmental Compliance

Responsible for the Environmental matters of the entire Corporation. Responsible for training division personnel according to OSHA and EPA standards. Assist in completing required EPA and OSHA reports. Assist in day to day decisions concerning environmental and other corporate matters. Evaluate other areas of Risk Management.

June
to March 1990

Detrex Corporation
Equipment Manufacturing Division
Bowling Green, Kentucky

Chief Engineer
Electronic & Environmental
Engineering
Departmental Manager

Responsible for the total implementation of all EPA and OSHA regulations for this facility. Wrote and implemented the following programs for the Bowling Green facility and the California Facility:

- Hearing Conservation Program
- Employee Right to Know Training
- Hazardous Waste Training
- Facility Contingency Plan
- Design and implemented Hazardous waste process flow
- File and monitor KYDES Discharge for State permit
- Manage Hazardous Waste Storage sight
- Designed training for OSHA 1910.120 Standards

Responsible for completing all reports for EPA and OSHA agencies that concern our facility.

Responsible for supervising design of Electronic Cleaning equipment. Evaluating design criteria to make sure equipment met current EPA emission criteria as well as OSHA regulations, IM. noise, safety guards, etc.

January 1984
to March 1984

Gordan Smith Compressors
Temporary Position

February 1979
to January 1984

Consultant

ENGINEER

Consulting work with various industries dealing with design specifications of tools and related components.

August 1974
Feb. 1979

Kentucky Dept. of Industrial
and Vocational Education

COORDINATOR- INDUSTRIAL TRAINING PROGRAMS

Worked with industry within a ten county area in setting

up specific training programs. Assisted Engineering Departments in determining required skills needed for productive employees. Recommended implementation of equipment modification for increase in productivity. Evaluated existing employees using various time study methods to determine productivity for the purpose of additional training or changes in production process.

Organizations

President Emeritus; South Central Kentucky Association of Environmental Managers

Senior Member; Society of Manufacturing Engineers

Member; Certified Environmental Trainers

Personal

Married: Kathleen Moore

Children: Jana Moore 8 years old

Health: Above average

Activities: Snow Skiing, Scuba Diving, Flying,
Instrumental Director Northfield Hills
Baptist Church

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SECTION I

CLOSURE AND POST-CLOSURE PLAN

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ATTACHMENT I-2	SCHEDULE OF CLOSURE
ATTACHMENT I-3	DECONTAMINATED AREA
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ATTACHMENT I-5	SURETY BOND FOR CLOSURE FUNDS
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SECTION I

CLOSURE AND POST-CLOSURE PLAN

The Eaton Avenue Facility specializes in the sale of halogenated solvent and the recovery (recycling) of spent solvents from sludges generated in degreasing operations. The facility operates under EPA Identification Number MID091605972. The Standard Industrial Classification (SIC) Codes for the facility are 2869 and 5161.

The hazardous waste management operations include container storage and tank storage. Wastes are received in container or bulk shipments. The wastes are processed through the recovery (recycling) system which primarily consist of distillation followed by drying. The recovered solvent product is drummed or stored in product tanks for re-sale and the still bottoms remaining after distillation are transferred to a 5,000 gallon generator accumulation tank. The still bottoms are accumulated for less than 90 days prior to shipment off site to a permitted facility.

All waste accepted at the facility and the waste bottoms remaining after the recovery (recycling) operation are classified as F001 or F002 hazardous wastes under 40 CFR Part 261. Detrex also recognizes the wastes as containing D-series compounds under the TCLP.

This section identifies operational activities which are necessary to completely close the hazardous waste container and tank storage areas and related equipment at the end of their intended operating lives. A post-closure plan is not required because this is not a disposal facility and all wastes are being removed at closure.

The closure plan and financial requirements are submitted pursuant to Michigan Act 64 Rule 299.9613 which incorporates 40 CFR §Part 264, Subpart G, by reference. The applicable section(s) of the Federal Regulations is referenced as appropriate.

Detrex Corporation will maintain an on-site copy of the approved closure plan, and all revisions to the plan, until the certification of closure completeness has been submitted and accepted by MDNR. Detrex will notify the Director at least 180 days prior to the date Detrex expects to begin final closure at the Eaton Avenue facility.

Upon completion of closure activities, Detrex Corporation will submit a certification to the MDNR Director verified by both Detrex Corporation and an independent registered professional engineer that the facility has been closed in accordance with the specifications in the approved closure plan. The closure document will be certified in accordance with 40 CFR § 270.11(d) and include, at minimum, the following.

1. Manifests (or some type of manifest/waste removal summary) of where and how much waste was shipped.
2. Certification statement by the owner/operator AND an independent registered engineer. All independent registered professional engineer certificates will have an original stamp on at least one copy.
3. Summary of decontamination procedures (pressure wash, steam clean, etc.) and how waste water was disposed.
4. Summary analysis (include time table, soil and groundwater results, weather conditions, runoff controls, equipment decontamination, etc.).
5. Results of all tests used to determine clean closure (chart, tables, lab sheets).
6. Statistical comparisons on sampling results compared to background.
7. Sampling and analysis procedures (specify references).
8. Final depth and elevations of excavations of wastes and soils.
9. Properly labelled and easily identified sampling grid stations (map); including background stations.
10. Groundwater data (and statistical evaluation) used to determine if groundwater degradation has occurred.
11. Summary of final restoration of excavated area, information on fill material used and/or future land use outline. If clean closure cannot be achieved (e.g. contaminated soils to water table and groundwater results show contamination) this summary item should be used to address the post closure program and/or corrective action.
12. A copy of the approved closure plan and letter of closure approval.

I-1 CLOSURE PLAN [40 CFR §270.14(b)(13), §264.112]

I-1a Closure Performance Standard [40 CFR §264.111]

This closure plan is designed to ensure that the facility will be closed in a manner that:

- 1) Minimizes the need for further maintenance; and
- 2) Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, or hazardous constituents to the ground or surface waters or to the atmosphere.

The following sections present, in detail, efforts which will be made to satisfy the closure performance standard.

**1-1b Partial Closure and Final Closure Activities
[40 CFR §264.112(a)(1)]**

At such times in the operating life of the facility that equipment may be updated, replaced or different operations may commence, partial closure of the facility in the form of most likely tank closure may take place. Closure procedures for partial closure would be essentially identical to those stipulated in this Closure Plan for final closure, as appropriate to the unit scheduled for partial closure. Waste inventory present at time of partial closure and/or waste generated during closure (i.e. decontamination fluids) would be managed in accordance with remaining facility operations. The waste would be processed through the solvent recovery unit or transported off-site to a permitted facility under the fuels blending program.

I-1c Maximum Waste Inventory [40 CFR §264.112(a)(2)]

The maximum hazardous waste inventory expected to be in storage at any given time is 13,750 gallons. This includes 8,250 gallons of container capacity and 5,500 gallons of tank capacity.

Table I-1 lists the various wastes handled at the facility, their EPA hazardous waste identification number, and their respective hazardous constituent/characteristic.

TABLE I-1
LIST OF HAZARDOUS WASTES

<i>Hazardous Waste</i>	<i>EPA Hazardous Waste Number</i>	<i>Hazardous Constituent/Characteristic</i>
1,1,1 Trichloroethane	F001/F002	Toxic
Trichloroethylene	F001/F002	Toxic
Perchloroethylene	F001/F002	Toxic
Methylene Chloride	F001/F002	Toxic
Trichlorotrifluoroethane	F001/F002	Toxic
Arsenic	D004	Toxic
Barium	D005	Toxic
Cadmium	D006	Toxic
Chromium	D007	Toxic
Lead	D008	Toxic
Mercury	D009	Toxic
Selenium	D010	Toxic
Silver	D011	Toxic
Benzene	D018	Toxic
Carbon Tetrachloroide	D019	Toxic
Chlorobenzene	D021	Toxic
Chloroform	D022	Toxic
1,4-Dichlorobenzene	D027	Toxic
1,2-Dichloroethane	D028	Toxic
1,1-Dichloroethylene	D029	Toxic
2,4-Dinitrotoluene	D030	Toxic
Hexachloroethane	D034	Toxic
Methyl Ethyl Ketone	D035	Toxic
Nitrobenzene	D036	Toxic
Pyridine	D038	Toxic
Tetrachloroethylene	D039	Toxic
Trichloroethylene	D040	Toxic
Vinyl Chloride	D043	Toxic

I-1d Inventory Removal and Disposal or Decontamination of Equipment [40 CFR §264.112(a)(3), §264.114]

At time of closure, assuming a third party is completing the closure, the maximum waste inventory will be transported to an off-site licensed hazardous waste management facility. The contents of the hazardous waste storage tanks would be transferred to a permitted hazardous waste tanker truck for transportation. Any material contained within the process unit at time of closure would be transferred to DOT-approved containers. The container inventory would be transferred utilizing a suitable drum pump and flexible hosing to a licensed hazardous waste tanker truck for transportation.

I-1d(1) Closure of Containers [40 CFR §264.178]

Following the removal of the container inventory, the container storage area and the entire secondary containment system will be swept. The sweepings will be placed in DOT-approved containers. The solid waste (i.e. sweepings) will be characterized as F002 waste based on historical operations and transported off site to a licensed hazardous waste management facility. The area will be decontaminated by a floor wash/scrubbing operation followed by a triple rinse steam cleaning. Wash water generated will be collected, using pumps, sponges and/or absorbent material and placed in DOT-approved containers. The material will be characterized as a F002 waste based on the wastes stored at the facility. The rinsate sampling analysis, discussed below, will be used to confirm elevated levels of organics. If no elevated levels above detection level are observed, the material will be discharged in accordance with the Sites Detroit Water and Sewage Department Wastewater Discharge permit. If detectable levels are observed the waste will be transported off site to a licensed hazardous waste management facility. Attachment I-3 delineates all areas to be decontaminated under closure.

It is estimated that approximately 300 gallons of waste wash water and one drum of solid waste will be generated during the decontamination process.

Decontamination will be verified by collecting a minimum of two samples of the rinsate (i.e. the initial rinsate and the final rinsate) and submitting the samples for analysis of the major constituents that were in storage. Analysis of rinsate/washwater samples will be SW846

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Method 8240. Table I-2 lists the parameters and practice quantification limits (PQLs). Subsequent cleaning operations (further steam cleaning or water

TABLE I-2

PRACTICAL QUANTIFICATION LIMITS FOR ORGANIC ANALYSES^a

		<i>Practical Quantification Limits</i>
		<i>Low Water (µg/L)</i>
<u>VOLATILE COMPOUNDS</u>		
74-87-3	chloromethane	10
74-83-9	bromomethane	10
75-01-4	vinyl chloride	5
75-00-3	chloroethane	10
75-09-2	methylene chloride	5
67-64-1	acetone	100
75-15-0	carbon disulfide	1
75-35-4	1,1-dichloroethene	1
75-35-3	1,1-dichloroethane	1
540-59-0	1,2-dichloroethene (total)	1
67-66-3	chloroform	1
107-06-2	1,2-dichloroethane	1
78-93-3	2-butanone	100
71-55-6	1,1,1-trichloroethane	1
56-23-5	carbon tetrachloride	1
108-05-4	vinyl acetate	50
75-27-4	bromodichloromethane	1
78-87-5	1,2-dichloropropane	1
75-25-2	bromoform	1
591-78-6	2-hexanone	50
108-10-1	4-methyl-2-pentanone	50
79-01-6	trichloroethene	1
71-43-2	benzene	1
79-00-5	1,1,2-trichloroethane	1
10061-01-15	cis-1,3-dichloropropene	1
127-18-4	tetrachloroethene	1
79-34-5	1,1,2,2-tetrachloroethane	1
108-88-3	toluene	1
108-90-7	chlorobenzene	1
100-41-4	ethylbenzene	1
100-42-5	styrene	1
1330-20-7	xylene (total)	1
124-48-1	dibromochloromethane	1
10061-02-6	trans-1,3 dichloropropene	1
110-75-8	2-chloroethyl vinyl ether	10
	ortho-dichlorobenzene	0.5
	trichlorotrifluoroethane	5.0
	trichlorofluoromethane	5

Notes:

- a Specific PQLs are highly matrix dependent. The PQLs listed herein are provided for guidance and may not always be achievable.

rinses) will be implemented as necessary until rinsate sampling and analysis indicates non-detectable levels have been reached.

It should be noted that severe staining on the concrete would also trigger more extensive cleaning. The rinsate samples will be collected in 3 x 40 mL glass vials and placed in coolers, packed with ice to approximately 4°C and shipped under chain-of-custody protocols to the preselected approved laboratory. One blind duplicate sample and one field blank sample will be collected for every ten rinsate samples collected as a check on laboratory and field QA/QC procedures. A trip blank will also be supplied by the laboratory and analyzed for the same parameters as the rinsate sample as a check on cross-contamination during shipment.

I-1d(2) Closure of Tanks [40 CFR §264.197]

Any tank sludges and tank scale existing in the storage tank, will be hand shovelled into DOT-approved containers. Such wastes, based on Detrex's former utilization of the tank, will be classified as F002 waste. The containers will be subsequently be transported off site to a permitted facility.

Following removal of any remaining sludges and tank scale from the tank designated for closure, Detrex will decontaminate the interior and exterior of tank. The decontamination protocol to be followed is summarized as follows:

- a) Solvent rinse the interior and exterior of each tank with 1,1,1-Trichloroethane, and allow to air dry for 15 minutes;
- b) High pressure, steam clean the interior and exterior of the tank, repeat three times and allow to air dry; and
- c) Visually inspect the interior and exterior of the tank for residuals. If residuals are visually evident, repeat steps (a) and/or (b) until the tank is clean. After the final steam rinse, allow the tank to air dry for 24 hours.

All piping and other equipment associated with the hazardous waste tank will also be disassembled and decontaminated. The decontamination protocol will be the same as specified above for the tank.

Following decontamination, the hazardous waste storage tank and all piping and other equipment associated with the tanks will be considered non-hazardous. Therefore, the handling of the tanks and all piping and other equipment after decontamination is not included under the closure cost estimate or closure schedule.

Tank decontamination will be conducted within the secondary containment area. The solvent rinse and wash water resulting from steam cleaning the interior of the tank will be collected directly from the tank into 5-gallon pails or equivalent. Decontamination of the secondary area will be scheduled to occur subsequent to the tank decontamination. Therefore, any decontamination fluids or steam mist which contacts the base of the secondary containment area during tank cleaning will be addressed during decontamination of the secondary containment area.

All solvent rinses and wash water generated will be transferred into DOT-approved containers for ultimate transportation off site to a permitted facility. All wastes, based on Detrex's previous recycling operation, will be classified as F002 wastes unless rinsate sampling conducted as verification of cleanup reveals the material is non-hazardous.

I-1d(3) Closure of Loading/Unloading Area

The entire outdoor concrete loading/unloading area will be swept and subsequently cleaned according to the protocols described above for the container storage area and associated secondary containment system.

In the event that any significant cracks are identified in the loading/unloading area, coreholes will be drilled through the concrete and beneath the sump and samples of the native material beneath the concrete collected to ensure clean closure. Analytical parameters shall be as identified earlier for rinsate sampling. Analytical results of sampling will be forwarded to the WMD and a plan of remediation developed if any detectable levels of organics are identified. The plan would be reviewed and approved by the WMD prior to implementation.

I-1e Schedule of Closure [40 CFR §264.112(a)(4)]

Within 45 days after receipt of the final volume of hazardous wastes, and at the direction of Detrex Corporation, final closure

activities will be initiated and completed within 180 days of this occurrence. The Director will be notified by Detrex 180 days before beginning final closure.

A proposed closure schedule is presented as Attachment I-2. Final closure will be certified by both Detrex Corporation and an independent professional engineer.

I-1f Extensions for Closure Time [40 CFR §264.113(a) and (b)]

Detrex Corporation does not anticipate requiring an extension for closure time for facility.

I-2 NOTICE IN DEED AND NOTICE TO LOCAL AUTHORITY
[40 CFR §270.14(b)(14) §264.120, §264.117(c), §264.119]

Notation is not necessary in any deed informing potential purchasers of restrictions associated with a disposal site because this facility is only a hazardous waste storage facility and no hazardous wastes will be disposed on site at any time.

I-3 CLOSURE COST ESTIMATE [40 CFR §270.13(b)(15), 264.142]

The closure cost information is presented in accordance with proper requirements. The estimate assumes complete third party costs. The total closure cost for the closure of the Detrex Corporation facility's hazardous waste storage area is estimated at \$89,370 (1991 dollars). Attachment I-4 provides a closure cost estimate. Activities include removal of waste inventory, decontamination and closure certification.

The cost estimate assumptions made are:

- 1) All hazardous waste will be transported off site to a permitted facility in accordance with all State and Federal regulations.
- 2) Labor costs are presented at \$29.00 per hour to account for labor costs and \$34.00 per hour for supervisors. All labor rates reflect commercial rates and include fringe benefits, payroll burden and taxes.
- 3) Total costs include a 10% contingency for administrative and 25% contingency for miscellaneous operating costs.

This closure cost estimate will be maintained at this facility. It will be revised whenever a change in the closure plan affects the cost of closure. It will be adjusted as required by pertinent regulations.

I-4 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE
[40 CFR §270.14(b)(15) and 264.143]

Financial assurance for closure costs is provided by a surety bond. A copy of the surety bond is provided as Attachment I-5 as soon as it becomes available.

I-5 LIABILITY INSURANCE [40 CFR §270.14(b)(17) and 264.147]

I-5a Sudden Accidental Occurrences [40 CFR §264.147(a)]

Financial assurance for sudden accidental insurance is provided by a demonstration that Detrex Corporation meets the financial test. Attachment I-6 includes a copy of the independent CPA's report on the examination of the Company's latest financial statement, a special CPA report on the data used by the Company's chief financial officer (CFO), and the CFO's certification.

I-5b Non-Sudden Occurrences [40 CFR §264.147(b)]

The facility does not have a surface impoundment, landfill or land treatment facility; hence, coverage for nonsudden accidental occurrences is not required.

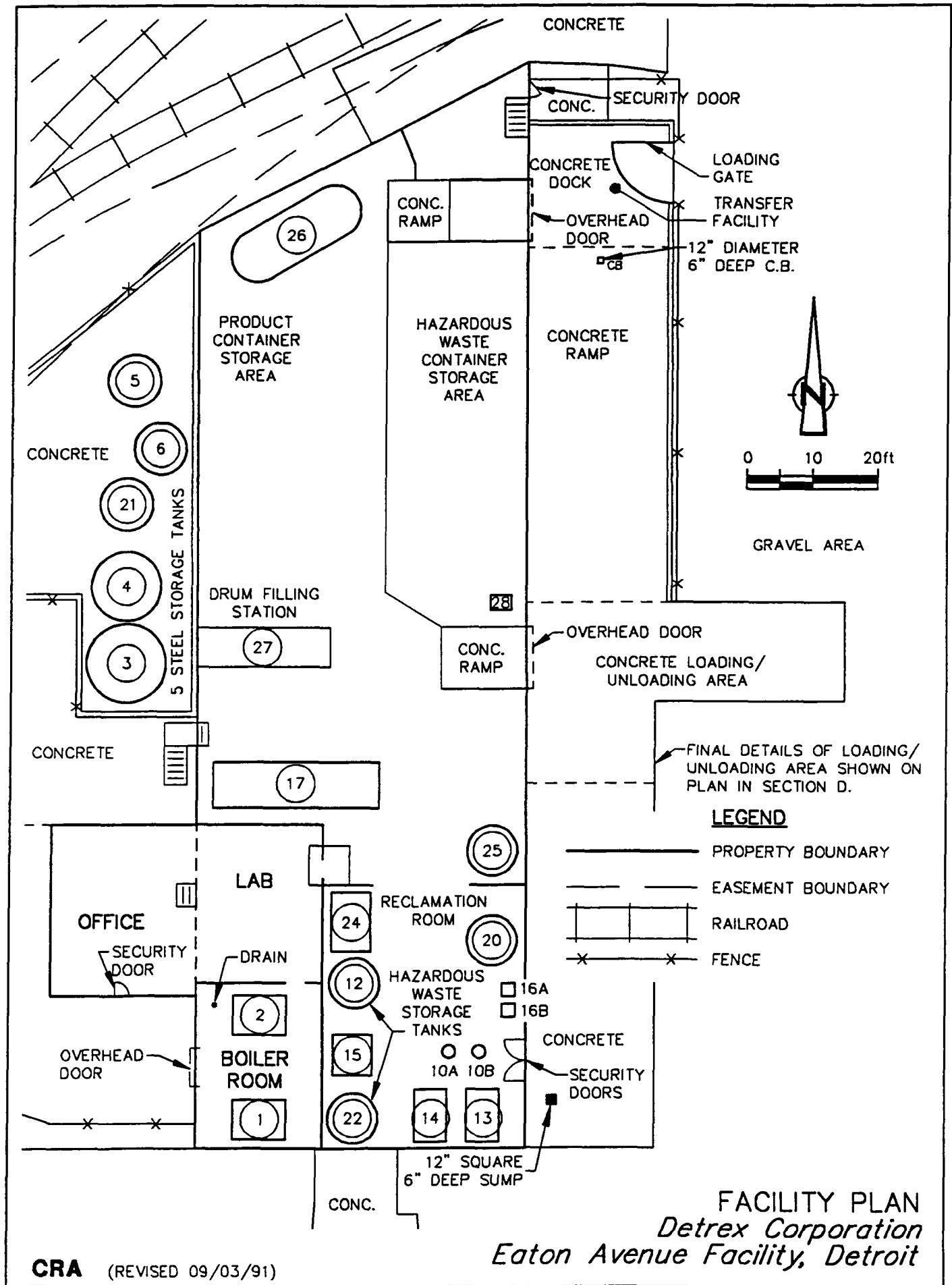
I-6 STATE ASSUMPTION OF RESPONSIBILITY [40 CFR §270.14(b)(18)]

Detrex Corporation does not intend to request State assumption of the legal or financial responsibilities for the Eaton Avenue facility.

ATTACHMENTS

ATTACHMENT I-1

FACILITY PLAN



LIST OF PROCESS EQUIPMENT

<i>I.D. No.</i>	<i>Equipment Name</i>	<i>Description</i>
1.	Generator	Clayton Model E-100 Steam Generator. Unit burns natural gas to produce steam at the rate of 3450 lbs./hr. at 100 psig.
2.	Air Compressor	
3.	20,000 gal. Product Tank	20,000 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
4.	10,000 gal. Product Tank	10,000 gallon carbon steel storage tank for storage of Trichloroethylene
5.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Perchloroethylene.
6.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Trichloroethylene
10 A/B	2 - 600 gal. Receiver Tanks	Used for receiving product from Detrex stills. (Operated at atm. pressure).
12.	2,300 gal. Hazardous Waste tank storage tank	2,300 gallon carbon steel storage tank used for storage of F001 or F002 material prior to processing
13.	350 gal. Detrex Still	Detrex Model S-350. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
14.	350 gal. Detrex Still	Detrex Model S-600. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
15.	DCI Still	DCI Model Dyna-1-100 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 100 gallons per hour.
16 A/B	Drying Columns	Detrex Dual Column Drier. Used to remove water from recovered product (solvent) via adsorption.

LIST OF PROCESS EQUIPMENT

<i>I.D. No.</i>	<i>Equipment Name</i>	<i>Description</i>
17.	5,000 gal. Still Bottom Tank	5,000 gallon carbon steel storage tank. Used for temporary accumulation of still bottoms from recovery of chlorinated solvents (F002 material).
20.	2,500 gal. Holding Tank	2,500 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
21.	4,500 gal. 1,1,1 Trichloroethane	4,500 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
22.	4,500 gal. Hazardous Waste Storage Tank	4,500 gallon carbon steel storage tank used for temporary storage of F001 or F002 material prior to being processed by Detrex stills.
24.	DCI Still	DCI Model Dyna-1-500 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 500 gallons per hour.
25.	3,000 gal. Holding Tank	3,000 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
26.	SVRM - Carbon Absorption Unit	
27.	Drum Filling Station	Product Drumming Station. Used for filling 55-gallon drums with product. Unit can fill approximately 30 drums per hour and is operated as necessary.
28.	Product Blending Vessel	550 gallon carbon steel vessel utilized for product blending.

ATTACHMENT I-2

SCHEDULE OF CLOSURE

ACTIVITY

DURATION (DAYS)

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180

1. Receipt of final volume of hazardous waste

*

2. Off-Site disposal of final waste inventory (containers and tanks)

1

90

3. Decontamination and dismantlement of tanks and associated process lines

91

#

120

4. Decontamination of secondary containment system.

121

#

140

5. Containerization and off-site disposal of sweepings and wash waters

141

170

6. Completion of closure and certification submittal to MDNR Director

171

180

LEGEND

— ACTIVITY DURATION

* EVENT

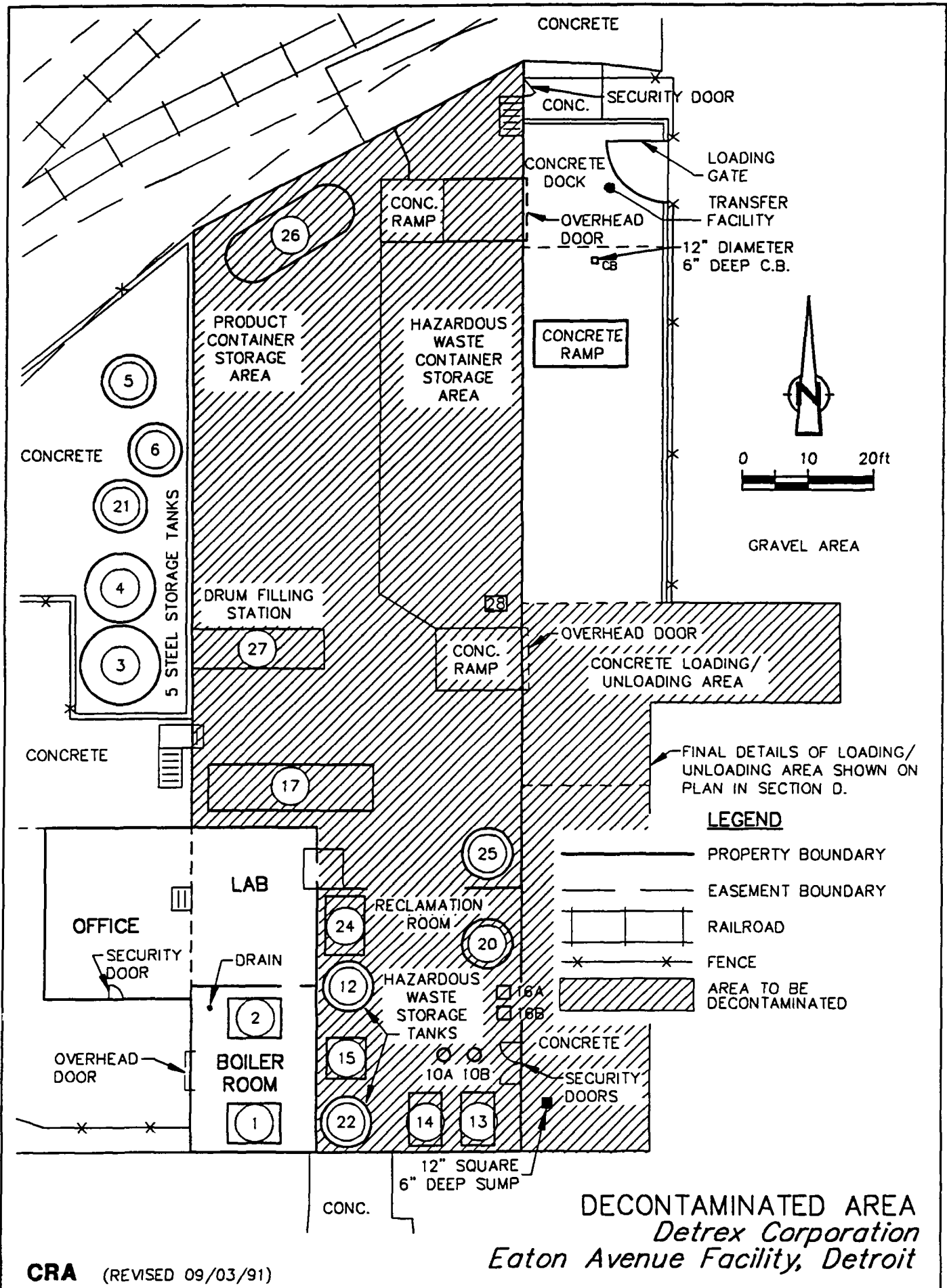
INSPECTION/SAMPLING EVENT

CRA

Attachment I-2
PROPOSED CLOSURE SCHEDULE
Detrex Corporation, Eaton Avenue Facility

ATTACHMENT I-3

DECONTAMINATED
AREA



ATTACHMENT I-4

CLOSURE COST ESTIMATE

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ATTACHMENT I-4
CLOSURE COST ESTIMATE (1991 \$)

<i>Item</i>	<i>Activity</i>	<i>Estimated Cost</i>
1.	Removal and Off-Site Disposal of Final Waste Inventory	
	a) transfer tank and drum inventory to bulk hazardous waste transport vehicles.	
	- labor: 4 man days @ \$232/day	\$ 928
	- supervision: 2 man days @ \$272/day	544
	- protective safety equipment @ \$100/man day	600
		<hr/>
		\$ 2,072
2.	Transportation and Disposal of Waste Inventory at Permitted Off-Site Facility	
	a) transportation 3 loads @ \$2,200/load	\$ 6,600
	b) disposal 13,750 gallons @ \$2.50/gallon	35,750
		<hr/>
	Subtotal 2	\$ 42,350
3.	Drum Handling	
	a) rinse 150 drums and containerize rinsate	
	- labor: 4 man days @ \$232/day	\$ 928
	- supervision: 2 man days @ \$272/day	544
	- protective safety equipment @ \$100/man day	600
	- transport and dispose 4 drums @ \$400/drum	1,600
		<hr/>
	Subtotal 3	\$ 3,672

Date: 06/24/91
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Attachment: I-4

ATTACHMENT I-4
CLOSURE COST ESTIMATE (1991 \$)

<i>Item</i>	<i>Activity</i>	<i>Estimated Cost</i>
4.	Tank and Process Line Decontamination	
a)	remove and drum tank sludge/scale	
-	labor: 1 man day @ \$232/man day	\$ 232
-	supervision: 1/2 man day @ \$272/man day	136
-	protective safety equipment @ \$100/man day	150
-	transport and dispose 3 drums @ \$400/drum	1,200
b)	decontamination tank and process lines	
-	labor 2 man days @ \$232/man days	464
-	supervision 1 man day @ \$272/man day	272
-	equipment @ \$400/day	400
-	protective safety equipment @ \$100/man day	300
-	transport and dispose 4 drums @ \$400	1,600
		<hr/>
	Subtotal	\$ 4,754
5.	Sweep and clean secondary containment area (including loading/unloading area)	
-	labor: 8 man days @ \$232/man day	\$ 1,856
-	supervision: 2 man days @ \$272/man day	544
-	equipment: @ \$400/day	800
-	rinsate sampling and analysis @ \$350/sample	1,750
-	transport and dispose 6 drums @ \$400/drum	2,400
		<hr/>
	Subtotal	\$ 7,350

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Attachment: I-4

ATTACHMENT I-4
CLOSURE COST ESTIMATE (1991 \$)

<i>Item</i>	<i>Activity</i>	<i>Estimated Cost</i>
6.	Closure Certification	
a)	outside consultant to review final closure plan and certify closure	\$ 5,000
b)	disbursements including office expenses and travel expenses	1,000
		<hr/>
	Subtotal 6	\$ 6,000
	Subtotal(1 to 6)	\$ 66,198
	Administration (10%)	\$ 6,620
	Contingency (25%)	<u>\$ 16,550</u>
	Total	<u><u>\$ 89,368</u></u>

ATTACHMENT I-5

SURETY BOND FOR CLOSURE FUNDS

file

DETREX CORPORATION

P.O. Box 5111, Southfield, MI 48086-5111

July 1, 1991



FAX: (313) 358-5803

TELEPHONE:
(313) 358-5800

Ms. Rhonda Hall
Environmental Engineer
Michigan Department of Natural Resources
Waste Management Division
Hazardous Waste Permit Section
P.O. Box 30241
Lansing, MI 48909

RE: Detrex Corporation - Solvent & Environmental Service
Division
12886 Eaton Ave.
Detroit, Michigan 48227
MID 091 605 972
Closure Bond

Dear Ms. Hall,

Enclosed is Bond number U1662860 issued on behalf of
Detrex Corporation for \$100,000 dollars U.S.. This bond is
for the financial closure assurance for Detrex Corporations'
facility located at 12883 Eaton Ave., Detroit, Michigan. This
bond is in effect June 24, 1991.

Please note the issuing company has canceled the
previous issued bond.

If additional information is needed, please do not
hesitate to contact me.

Sincerely,

William M. Moore, Jr.

William M. Moore, Jr.
Corporate Manager,
Environmental Compliance,
RCRA Section

cc: I. Shamiyeh
M. Tepatti
R. Hritzkowin



SURETY BOND FOR GUARANTEEING PERFORMANCE
OF CLOSURE AND/OR POST-CLOSURE CARE

PERFORMANCE BOND

Bond Number: U1662860

Total Penal Sum of Bond: \$100,000.00

Effective Date: June 24, 1991

EPA Identification Number: MID 091605972

Closure Costs: \$ 100,000.00 Post-Closure Costs: \$ ZERO (0)

FACILITY: EATON AVENUE GOLD SHIELD

ADDRESS: 12886 Eaton Avenue

Detroit, Wayne, Michigan 48227

GOLD SHIELD DIVISION OF DETREX CORPORATION, a Michigan Corporation,
of P. O. Box 5111, Southfield, MI 48086-5111, as principal, and _____

UNITED PACIFIC INSURANCE COMPANY, Federal Way, Washington, an insurer
authorized to transact the business of surety and fidelity insurance
in the State of Michigan and an acceptable surety on federal bonds as
listed in circular 570 of the United States Department of Treasury,
are firmly bound unto the Director of the Department of Natural Resources,
on behalf of the State of Michigan, his successor or successors in office,
or his authorized representative, in the above total penal sum, lawful
money of the United States of America, for the payment of which we bind
ourselves, our heirs, executors, administrators, successors, and assigns,
jointly and severally.

WHEREAS, the Principal is required under 1979 PA 64, as amended,
Michigan's Hazardous Waste Management Act, to have an operating license
to own or operate each hazardous waste management facility identified
above, and

WHEREAS, the Principal is required to provide financial assurance
for the closure or post-closure care of each facility identified above
as a condition of an operating license,

NOW, THEREFORE, the conditions of this obligation are such that if the
Principal shall faithfully perform closure, whenever required to do so,
of each facility for which this bond guarantees closure, in accordance
with the closure plan and other requirements of the operating license
as such plan and operating license may be amended, pursuant to all
applicable laws, statutes, rules and regulations, as such laws, statutes,
rules and regulations may be amended,

And, if the Principal shall faithfully perform post-closure care of each facility for which this bond guarantees post-closure care, in accordance with the post-closure plan and other requirements of the operating license, as such plan and operating license may be amended, pursuant to all applicable laws, statutes, rules and regulations, as such laws, statutes, rules and regulations may be amended,

Or, if the Principal shall provide alternate financial assurance as specified in the Administrative Rules promulgated under 1979 PA 64, as amended, and obtain the Director's written approval of such assurance within 90 days after the date notice of cancellation is received by both the Principal and the Director from the Surety, then this obligation shall be null and void, otherwise it is to remain in full force and effect.

The surety shall become liable on this bond obligation only when the principal has failed to fulfill the conditions described above.

In the event that the Director of the Department of Natural Resources, in accordance with the Administrative Rules promulgated pursuant to 1979 PA 64, as amended, issues a Notice of Violation or other order indicating that the Principal has failed to properly execute its closure responsibilities for a facility for which this bond guarantees performance of closure, the Surety shall either perform closure in accordance with the closure plan and other operating license requirements, or make payment of the closure amount guaranteed by this bond for closure of the facility to the Director of the Department of Natural Resources.

In the event that the Director of the Department of Natural Resources, in accordance with the administrative rules promulgated pursuant to 1979 PA 64, as amended, issues a Notice of Violation or other order indicating that the Principal has failed to properly execute its post-closure care responsibilities for a facility for which this bond guarantees performance of post-closure care, the surety shall either perform post-closure care in accordance with the post-closure plan and other operating license requirements, or make payment of the post-closure care amount guaranteed by this bond for post-closure care of the facility to the Director of the Department of Natural Resources.

The Surety hereby waives notification of amendments to closure and post-closure care plans, licenses, applicable laws, statutes, rules and regulations and agrees that no such amendment shall in any way alleviate its obligation on this bond, except for adjustments in the closure and post-closure care plans that cause increases or decreases in the penal sum contained herein.

When the current closure or post-closure cost estimate, or both, increase to an amount more than the penal sum, the Principal, within 60 days after the increase, shall either cause the penal sum to be increased to an amount at least equal to the current closure or post-closure cost estimate, or both, and submit evidence of such increase to the Director of the Department of Natural Resources or obtain other financial assurance as specified in Part 7 of the Administrative Rules promulgated under 1979 PA 64, as amended. When the current closure or post-closure cost

estimate decreases, the penal sum may be reduced to the amount of the current closure or post-closure cost estimate following written approval by the Director of the Department of Natural Resources.

The liability of the Surety shall not be discharged by any payment or succession of payments hereunder, unless and until such payment or payments shall amount in the aggregate to the penal sum of the bond, but in no event shall the obligation of the Surety hereunder exceed the amount of said penal sum.

The Surety may cancel the bond by sending notice of cancellation by certified mail to the Principal and to the Director, Department of Natural Resources, provided, however, that cancellation shall not occur during the one hundred twenty (120) days beginning on the date of receipt of the notice of cancellation by the Principal and the Director, Department of Natural Resources as evidenced by the return receipt.

Provided further, that this Performance Bond may be drawn upon and the Surety agrees to honor this bond should the Principal fail to provide the Director with an extension of this bond, or an acceptable replacement bond, or an alternative form of financial assurance as specified in Part 7 of the Administrative Rules promulgated under 1979 PA 64, as amended, and acceptable to the Director, not less than sixty (60) days prior to the expiration or cancellation hereof.

The Principal may terminate this bond by sending written notice to the Surety, provided, however, that no such notice shall become effective until the Surety receives written authorization for termination of the bond from the Director, Department of Natural Resources, or his authorized representative.

This bond shall be and continue in force for a period beginning with the effective date of the bond and terminating on the same date One (1) years hence. This bond may be extended by continuation or extension certificate signed by the Principal and Surety to cover renewal license or licenses. Upon determination of the Director of the Department of Natural Resources, or his authorized representative, that any of the foregoing conditions have not been complied with, he shall have recourse to the rights created under this bond.

In witness whereof, the Principal and the Surety have executed this Performance Bond and have affixed their seals and have attached the justification or power of attorney as of the day and date first above written.

The persons whose signatures appear below hereby certify that they are authorized to execute this surety bond on behalf of the Principal and Surety and that the wording of this surety bond is identical to the wording provided by the Director on the date this bond was executed.

Sealed with our seals, dated the 24th day of June, 1991

By acceptance of
this bond, the Oblige
agrees that Bond No.
U1609861, originally
effective October 16,
1989 is hereby
terminated.

PRINCIPAL

GOLD SHIELD DIVISION OF DETREX CORPORATION

By: *Ferd J. Chmielnicki* (SEAL)

Name: Ferd J. Chmielnicki

Title: Corporate Secretary

SURETY

UNITED PACIFIC INSURANCE COMPANY
a Washington Corporation

By: *Richard E. Seaman*

Name: Richard E. Seaman

Title: Attorney-in-fact

Bond Premium: \$2,000.00



UNITED PACIFIC INSURANCE COMPANY

HEAD OFFICE, FEDERAL WAY, WASHINGTON

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, That the UNITED PACIFIC INSURANCE COMPANY, a corporation duly organized under the laws of the State of Washington, does hereby make, constitute and appoint JoAnne Terry, Carter G. Mann, Richard E. Seaman and Virginia L. Townsend, individually, of Detroit, Michigan

its true and lawful Attorney-in-Fact, to make, execute, seal and deliver for and on its behalf, and as its act and deed any and all bonds and undertakings of Suretyship, _____

and to bind the UNITED PACIFIC INSURANCE COMPANY thereby as fully and to the same extent as if such bonds and undertakings and other writings obligatory in the nature thereof were signed by an Executive Officer of the UNITED PACIFIC INSURANCE COMPANY and sealed and attested by one other of such officers, and hereby ratifies and confirms all that its said Attorney(s)-in-Fact may do in pursuance hereof.

The Power of Attorney is granted under and by authority of Article VII of the By-Laws of UNITED PACIFIC INSURANCE COMPANY which became effective September 7, 1978, which provisions are now in full force and effect, reading as follows:

ARTICLE VII — EXECUTION OF BONDS AND UNDERTAKINGS

1. The Board of Directors, the President, the Chairman of the Board, any Senior Vice President, any Vice President or Assistant Vice President or other officer designated by the Board of Directors shall have power and authority to (a) appoint Attorneys-in-Fact and to authorize them to execute on behalf of the Company, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof, and (b) to remove any such Attorney-in-Fact at any time and revoke the power and authority given to him.

2. Attorneys-in-Fact shall have power and authority, subject to the terms and limitations of the power of attorney issued to them, to execute and deliver on behalf of the Company, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof. The corporate seal is not necessary for the validity of any bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof.

3. Attorneys-in-Fact shall have power and authority to execute affidavits required to be attached to bonds, recognizances, contracts of indemnity or other conditional or obligatory undertakings and they shall also have power and authority to certify the financial statement of the Company and to copies of the By-Laws of the Company or any article or section thereof.

power of attorney is signed and sealed by facsimile under and by authority of the following Resolution adopted by the Board of Directors of UNITED PACIFIC INSURANCE COMPANY at a meeting held on the 5th day of June, 1979, at which a quorum was present, and said Resolution has not been amended or repealed:

"Resolved, that the signature of such directors and officers and the seal of the Company may be affixed to any such power of attorney or any certificate relating thereto by facsimile, and any such power of attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by facsimile signatures and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached."

IN WITNESS WHEREOF, the UNITED PACIFIC INSURANCE COMPANY has caused these presents to be signed by its Vice President, and its corporate seal to be hereto affixed, this 26th day of October 1990,

UNITED PACIFIC INSURANCE COMPANY

Vice President

STATE OF Pennsylvania ss.
COUNTY OF Philadelphia



On this 26th day of October, 1990, personally appeared Raymond MacNeil

to me known to be the Vice-President of the UNITED PACIFIC INSURANCE COMPANY, and acknowledged that he executed and attested the foregoing instrument and affixed the seal of said corporation thereto, and that Article VII, Section 1, 2, and 3 of the By-Laws of said company and the Resolution, set forth therein, are still in full force.

My Commission Expires:

February 1, 1993



Notary Public in and for State of Pennsylvania
Residing at Philadelphia

I, Ray L. Lorah, Assistant Secretary of the UNITED PACIFIC INSURANCE COMPANY, do hereby certify that the above foregoing is a true and correct copy of a Power of Attorney executed by UNITED PACIFIC INSURANCE COMPANY, which is still in full force effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said Company this 24th day of June 1991



Assistant Secretary

ATTACHMENT I-6

FINANCIAL ASSURANCE FOR
LIABILITY INSURANCE

DETREX CORPORATION

P.O. Box 5111, Southfield, MI 48066-5111



FAX: (313) 356-5803

TELEPHONE:
(313) 356-5800

March 28, 1991

Michigan Department of Natural Resources
Hazardous Waste Division
P.O. Box 30028
Lansing, MI 48909

Re: Financial Requirements - Annual Report

Dear Sir or Madam:

Enclosed is the following:

1. A letter by our chief financial officer
2. Our 1990 Annual Report
3. A statement by our independent Certified Public Accountant

Should you have any questions, please call or write me personally.

Sincerely,

William M. Moore, Jr.
Corporate Manager,
Environmental Compliance,
RCRA Section

enclosure
cc: M. Tepatti
Facility Manager

DETREX CORPORATION

P.O. Box 5111, Southfield, MI 48086-5111

March 28, 1991

FAX: (313) 358-5803

TELEPHONE:
(313) 358-5800



Director
Michigan Department of Natural Resources
Hazardous Waste Division
P.O. Box 30028
Lansing, MI 48909

I am the chief financial officer of Detrex Corporation, P.O. Box 5111, Southfield, Michigan 48086-5111. This letter is in support of the use of the financial test to demonstrate financial responsibility for liability coverage as specified in Subpart H of 40 CFR 264 and 265.

The firm identified above is the owner or operator of the following facilities for which liability coverage for sudden accidental occurrences is being demonstrated through the financial test specified in Subpart H of 40 CFR 264 and 265:

Region	Facility Location	EPA Identification
I	Gold Shield Solvents 260 Chapel Road So. Windsor, CT 06074	CTD 01 016 8870
I	Gold Shield Solvents 835 Industrial Highway Unit No. 1 Cinnaminson, NJ 08077	NJD 04 731 8043
IV	Gold Shield Solvents P.O. Box 5274 Charlotte, NC 28225	NCD 04 977 3245
V	Gold Shield Solvents 2537 LeMoyne Ave. Melrose Park, IL 60160	ILD 07 442 7938
V	Gold Shield Solvents 2263 Distributors Drive Indianapolis, IN 46241	IND 08 561 6837

V	General Chemicals Division North State Road Ashtabula, OH 44004	OHD 00 416 5924
V	Gold Shield Solvents 12886 Eaton Ave. Detroit, MI 48227	MID 09 160 5972
V	Gold Shield Solvents 312 Ellsworth Avenue, S.W. Grand Rapids, MI 49503	MID 02 090 6764
V	Gold Shield Solvents 1410 Chardon Rd., Rear Euclid, OH 44117	OHD 08 015 8702
VI	Gold Shield Solvents 322 International Parkway Arlington, TX 76011	TXD 98 062 6154
IX	Gold Shield Solvents 3027 Fruitland Ave. Los Angeles, CA 90058	CAD 02 016 1642

The firm identified above guarantees through the guarantee specified in Subpart H of 40 CFR Parts 264 and 265, liability coverage for sudden accidental occurrences at the following: NONE.

The firm identified above is the direct or higher-tier parent corporation of the owner or operator.

This firm is required to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends December 31. The figures for the following items marked with an asterisk are derived from this firm's independently audited year - end financial statement for the latest completed fiscal year, ended 1990.

1. Amount of annual aggregate liability coverage to be demonstrated	\$ 2,000,000
*2. Current assets	\$32,498,282
*3. Current liabilities	\$15,891,766

4. Net working capital (line 2 minus line 3)	\$16,606,516
*5. Tangible net worth	\$37,566,667
*6. If less than 90% of firm's assets are located in the U.S., given total U.S. assets.	100%

	YES	NO
7. Is line 5 at least \$10 million?	X	
8. Is line 4 at least 6 times line 1?	X	
9. Is line 5 at least 6 times line 1?	X	
*10. Are at least 90% of assets located in the U.S.? If not, complete line 11.	X	
11. Is line 6 at least 6 times line 1?	X	

I hereby certify that the wording of this letter is identical to the wording specified in 40 CFR 264.151(g) as such regulations were constituted on the date shown immediately below.


signature

C. B. Stockmeyer, Jr.
President
April 1, 1991

**INDEPENDENT AUDITORS' REPORT****Detrex Corporation:**

We have audited, in accordance with generally accepted auditing standards, the consolidated financial statements of Detrex Corporation and its subsidiaries for the year ended December 31, 1990, and have issued our report thereon dated March 1, 1991. We have not performed any auditing procedures beyond the date of our report on the consolidated financial statements; accordingly, this report is based on our knowledge as of that date and should be read with that understanding.

At your request, we have performed the procedures enumerated below with respect to the accompanying letter from C. B. Stockmeyer, Jr. to the Michigan Department of Natural Resources - Hazardous Waste Division dated March 28, 1991. It is understood that this report is solely for filing with the Michigan Department of Natural Resources - Hazardous Waste Division in accordance with requirements of the Michigan Administrative Rules, and is not to be used for any other purpose. The procedures that we performed are summarized as follows:

- . We compared the amounts included in items 2 and 3 on page 2 in the letter referred to above with the corresponding amounts in the consolidated financial statements referred to in the first paragraph.
- . We recomputed from, or reconciled to, the consolidated financial statements referred to in the first paragraph the information included in items 5, 6 and 10 on page 2 in the letter referred to above.

Because the procedures referred to in the preceding paragraph were not sufficient to constitute an audit made in accordance with generally accepted auditing standards, we do not express an opinion on any of the information or amounts listed on page 2 in the aforementioned letter. In performing the procedures referred to above, however, no matters came to our attention that caused us to believe that the information or amounts included in items 2, 3, 5, 6 and 10 should be adjusted.

Deloitte & Touche

March 28, 1991

Date: 06/24/91
Revision: 91-1
Page: J-1

SECTION J

ENVIRONMENTAL ASSESSMENT

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SECTION J
ENVIRONMENTAL ASSESSMENT

This section of the operating license application provides an environmental assessment on the hazardous waste container storage area design and operation as required by Michigan Act 64 Rule 299.9504(1)(e).

J-1 NEED FOR AND OBJECTIVE OF EXISTING FACILITY

The Detrex Corporation facility specializes in the sale of halogenated hydrocarbon solvents and cleaning equipment and the recovery (recycling) of solvents from wastes generated in degreasing operations. The hazardous waste management operations include container storage and tank storage. Wastes are received in drum or bulk shipments. The wastes are processed through the recovery (recycling) system which primarily consist of distillation followed by drying. The recovered solvent product is drummed or stored in product tanks for re-sale and the still bottoms remaining after distillation are transferred to a 5,000 gallon generator accumulation tank. The still bottoms are stored for less than 90 days prior to shipment off site to a permitted facility. It is the storage areas that require the facility to have a Michigan Act 64 Operating License.

The storage areas are used to temporarily store containerized and bulk hazardous halogenated solvent wastes prior to the wastes being processed in the recovery (recycling) operation. The storage areas are enclosed within a building that provides a safe and environmentally sound storage area for the wastes.

Container and tank storage are important units in the solvent recovery (recycling) operation, providing storage of an adequate volume of material to keep the recovery units operating and storing different solvent wastes so that each can be processed separately. The solvent recovery (recycling) operation provides an essential service to Detrex customers for the safe handling of their solvent wastes.

J-2 DESCRIPTION OF EXISTING ENVIRONMENT

The facility is located in north-western Detroit, Michigan. The site location is shown in Attachment J-1.

This section provides a description for the existing environment on and around the Detrex Corporation facility.

J-2a Physiography

J-2a(1) Topography

The surface topography of Southeast Michigan as seen today has been influenced by the bedrock topography and by the Wisconsinian glaciation of the late Pleistocene Epoch. Prior to glaciation, the landscape in Southeast Michigan was composed of two physiographic regions: the Thumb Upland area in the Livingston, Oakland and Washtenaw Counties; and the Eric-Huron Lowland in the Monroe and Wayne Counties. The Upper Devonian Berea Sandstone forms the approximate boundary between these two regions. During the advance and retreat of the glaciers, the glaciers established a lobate pattern of subdividing into the Lake Michigan, Saginaw and Lake Erie lobes. The lobe which most strongly affected the southern portions of Michigan (in which we are interested) was the Lake Erie lobe. The Lake Erie lobe preserved or even exaggerated the topographic features present before the glaciation.

The Lake Erie lobe advanced and retreated many times into the inland. As a result of these readvances and retreats, a series of end moraines and pitted and wash plains are now readily evident in the Oakland, Livingston and Washtenow Counties. As the glaciers retreat further, the areas to the southeast, i.e. Monroe, Macomb, St. Clair and Wayne Counties, were overlain by lake bottom deposits and the occasional water-laid moraine. This area is comprised of mainly silts and clays. These lacustrine plains are especially well developed in Wayne (i.e. where the facility is located) and Monroe Counties.

As a result of the glacial activity and the initial bedrock topography, the slope of the landscape is towards the southeast and northwest. In the Genesee and Shiawassee Counties which are northeast of Detroit, the topographic relief is greater. In the same direction, several morainic knolls in the Oakland, Livingston, Macomb and Washtenow Counties have elevations of more than 1,100 feet and a local relief of

approximately 600 feet. In contrast, Monroe County, which lies entirely within the lake plain, has only 160 feet of relief. The lowest point in the area is Lake Erie which has an average surface elevation of 568.6 feet.

The Detrex facility in Detroit is located on the flat lacustrine plain. Very little topographic relief exists close to the facility. The area is interrupted only by major drainage channels and markings of former beaches of glacial lakes. The closest major water course, the River Rouge, is some 15 miles away from the site.

The lands immediately surrounding the facility are at an approximate elevation of 656 feet AMSL. The building floor, which forms the base of the secondary containment area is an elevation of approximately 659 feet AMSL.

To the west of the facility, one railroad track moves in a northeast direction. One railroad spur enters the property directly north of the facility building. The elevation of the spur is approximately 656 feet AMSL.

Topographic maps for the facility are provided in Attachments B-2 and B-3 of this operating license application.

J-2a(2) Geology

As described previously, the main overburden material in Wayne County consists primarily of silts and clays with the occasional glacial moraine deposits. This thick layer of lacustrine material mantles a bedrock of sandstones, limestones, shales and dolomites. The downward sequence of the various bedrock formations beneath Wayne County includes the following:

Mississippian

Coldwater Shale - This unit exists at the northwest corner of Wayne County. The unit outcrops and subcrops in this area. The unit generally has low permeability.

Devonian

Berea Sandstone - This moderately fine grained sandstone can be 100 feet in thickness in spots.

Traverse Group - This alternating sequence of shales and limestones outcrops in the central portions of Wayne County.

Dundee Limestone - This unit is a fossiliferous limestone with high permeability.

Detroit River Group - This group includes sandstones, limestones and dolomite.

Sylvania Sandstone - This unit outcrops in the southeast reaches of Michigan.

Silurian

Bass Leland Group - This group is composed of fine grained dolomites.

Of the formations listed above, the following formations are reported to be used as a water supply source in Wayne County: Berea Sandstone, Traverse Group, Dundee Limestone, Detroit River Group, and the Sylvania Sandstone.

Several injection wells are located within Wayne County. Six Class I injection wells are used to inject industrial, nuclear or municipal wastes beneath the deepest stratum containing an underground drinking water source. Eight injection wells used for injecting fluids for solution mining, oil shale gasification or geothermal energy recovery are also reported for Wayne County. Thirty wells are reported to be used for Liquified Petroleum Gas storage. No brine injection wells are recorded in Wayne County.

J-2a(3) Soils

The soils in the Detroit area reflect strong glacial influences with lacustrine clay deposits and minor moraine deposits. Small quantities of sand reflect former beach areas. The composition of the soil provides for substantial strength and stability for structural development.

The facility is located within the Detroit City limits, therefore they have little significance in terms of agriculture. The soils at the facility serve as a base for structures and roads.

J-2b Climate

The climate of Detroit is influenced mainly by its location with respect to major storm tracks and the influence of the Great Lakes.

The major storm tracks occurring in this region originate from the northwest or the southeast of the region. In the winter, the northwest winds bring snowfall accumulations to all parts of Michigan, however, the heaviest precipitation in the City of Detroit is caused by the southeast winds. Although snowfall is the most common form of precipitation, rain, freezing rain and sleet may also occur. In the summer months, the northwest winds carry little precipitation to the City of Detroit. As the storms approach the city, they are often weakened and dissipate. Consequently, the weather is normally warm and humid reaching temperatures of 90°F and higher. Only occasional thunderstorms will alleviate the warm and humid stretches.

The most pronounced lake effect occurs in the winter when arctic air moves across the lakes and is warmed and moistened. This produces an excess of cloudiness but a moderation of cold wave temperatures. On warm summer days, occasional lake breezes help to lower temperatures in the eastern part of the city by 10 to 15 degrees.

Air pollution comes primarily from heavy industry spread along both shores of the waterway from Port Huron to Toledo. Wind dispersion is normally adequate to keep it from becoming a major problem.

Temperatures recorded at Detroit Metropolitan Airport range from -21°F in January 1984 to 102°F in July 1977. The average temperature for Detroit is 48.6°F with an average precipitation of 30.97 inches per year. (The average precipitation is based on a water equivalent measurement.)

J-2c Terrestrial Systems

The Detrex facility is situated on a 0.9-acre property in an industrial district of Detroit. The area is mostly devoid of vegetation and animal or bird life due to the development in the district.

For the purpose of providing an accurate detailed survey of the flora and fauna in the area surrounding the facility, Detrex contracted the firm Environmental Consultants, Inc. of Rochester, Michigan to

conduct a site survey. This report, prepared by an experienced biologist, entitled "Terrestrial Systems, Detrex Corporation - Gold Shield Solvents Facility, Detroit, Michigan", is included as Attachment J-2.

J-2d Aquatic Systems

In Wayne County, a total of 52 bodies of water with an areal extent of 5 acres or greater have been documented. Of the 52 bodies, 5 are marshes and 47 are warm water lakes. Together these water bodies comprise only 0.6 percent of the county. However, within 10 miles of the site, no major water course or water body exists.

J-2e Hydrology

The City of Detroit covers much of Wayne County. Detroit derives its water from surface sources. As such, very little groundwater is exploited in Wayne County. Of the 42 communities in Wayne County, 38 of these communities purchased water from another community, and four of these communities were supplied by surface water (EPA, 1981). No community reported the use of groundwater as a municipal supply source.

A number of non-community sources outside the Detroit City limits however have been recorded. Those geologic units capable of supplying water were listed in the Geology section. The table below summarizes the information as provided by the EPA (1981).

<i>Aquifer System</i>	<i># of Wells</i>	<i>Depth (ft)</i>	<i>Capacity (gpm)</i>
Glacial Drift Aquifer	15	62 - 122	13 - 4,000
Berea Sandstone	2	207 - 234	5 - 30
Traverse Group	1	126	100
Dundee Limestone	1	183	110
Detroit River Group	5	28 - 102	15 - 41
Sylvania Sandstone	2	66 - 135	50 - 300
Silurian-Devonian	1	475	40

The water quality from the bedrock aquifers is normally good. Water which is extracted from greater depths tends to have higher sulphate concentrations due to the presence of gypsum at depth. Limestone bedrock aquifers also tend to have increases in total dissolved solids. In

general, however, natural groundwaters in Wayne County have inorganic concentration measurements below EPA established guidelines.

In conclusion, groundwater users are mainly located out of City limits.

Much of the information from this section was taken from a United States Environmental Protection Agency Report entitled "Hydrogeology for Underground Injection Control in Michigan: Part 1, 1981".

J-2f Air Quality

A Wayne County air quality summary taken from the Michigan Department of Natural Resources "Air Quality Report - 1986", outlines air quality from 1971 to 1986 and is presented below.

Several networks monitor ambient air in Wayne County. The foremost is the Wayne County Air Pollution Control Division (WCAPC) which is operated by the county health department.

The WCAPC Division operates 20 suspended particulate samplers in Wayne County. Of these sites, two violated the primary annual geometric mean standard during 1986 - one in the City of Detroit (Site 82-005: Annual geometric mean 82 ug/m^3) and one in Dearborn (Site 82-032: Annual geometric mean 103 ug/m^3). A third site located in Detroit (82-091) had an annual geometric mean of 82 ug/m^3 but did not achieve 75% valid data retrieval. These same sites, which are located in a specific problem corridor, have been in violation during all previous years monitored. Years of suspended particulate monitoring data in Wayne County indicate approximately a 50% reduction of the annual average levels. In 1971, only three sites met the health-related standard under the clean air act; however, by 1981 the reverse held true.

None of the WCAPC total suspended particulate sites violated the primary 24-hour suspended particulate standard in Wayne County during 1986. Four Wayne County monitors registered violations of the 24-hour secondary standard; all in the downtown Detroit area. Although this is a

slight increase from 1985, it is an improvement over previous years monitored.

Four PM10 monitors, those which measure particulate matter 10 microns or less, are operated by WCAPC in Wayne County. Included are three Detroit, one River Rouge and one Dearborn monitoring sites. The annual arithmetic mean for January through December 1986 ranged from 38 to 55 ug/m³.

For the past three years the sulfur dioxide monitors in Wayne County met primary and secondary standards. Back in 1983, two excursions of the sulfur dioxide primary 24-hour standard were recorded at a site near ICL Trucking in Detroit. These excursions were running 24-hour averages and are therefore not recorded as a violation of the standard. A dispersion model is being used to identify future potential problems in the area. The other 18 sulfur dioxide sites which monitored Wayne County met all applicable standards. During the six years prior to 1983, continuous sulfur dioxide monitors from 14 sites throughout Wayne County indicated compliance with the standards.

The nitrogen dioxide annual standard was met at the two sites which operate in the city of Detroit. However, as was the problem in 1985, equipment malfunction again kept the sites from recording 75% valid data.

As in previous years, WCAPC operates continuous monitors for carbon monoxide. The past two years indicate compliance with the ambient standards. During 1984, one downtown Detroit site recorded a violation of the 8-hour standard. No violations were recorded during 1983. In 1982, one downtown location recorded a violation of the 8-hour standard. Sixteen excursions of the 8-hour standard occurred in 1979 at a downtown location. During both 1978 and 1977 over 70 excursions were recorded in the county - most at the downtown locations.

Monitoring for ozone was conducted at four sites in Wayne County during 1986. All sites were in compliance with the .12 ppm standard as in the previous two years. In 1983, the two Detroit sites exceeded the .12 ppm standard; one site once,

and the other site three times. During the summer of 1982, the Allen Park site recorded two excursions of the standard while one Detroit site and the Livonia site recorded one excursion each. One Detroit location exceeded the ambient 1-hour standard back in 1981.

The Wayne County Air Pollution Control Division operates eight calendar-quarter lead sites. All sites have complied with the standard since 1980, when the site located near the Jeffries Freeway violated the standard. In 1979 the same highway lead site showed violations for two consecutive quarters.

J-2g Aesthetics

The area in which the Detrex facility is located is an intensive industrial area of northwestern Detroit. The aesthetic value of this area is somewhat limited. Within the industrial sector, virtually all plant life occurs as "weedy" growth along fences, railroad tracks, etc.

The facility is not a source of unreasonable noise or other nuisance factors. The amount of truck and rail traffic to and from this facility is not inconsistent with other industries in the area. Traffic information, in relation to the movement of hazardous wastes, is discussed in Section B of this operating license application.

J-2h Land Use

Existing land use and zoning in the site area is shown on Attachments J-3 and J-4, respectively. The facility is located in an intensive industrial district (M4) with surrounding single family residential (R1). The nearest residence is located over 300 feet west of the facility.

J-2i Archaeological and Historical Resources and Site

The facility is an existing industrial operation in an intensive industrial area. The site has been reviewed by the State Historic Preservation Officer (SHPO) of the Michigan Department of State, Michigan History Division. It is the SHPO's opinion that the site is not eligible for

listing in the Natural Register of Historic Places. The result of their review is presented in Attachment J-5.

J-2j Social-Economic Environment

The City of Detroit is a large metropolitan city encompassing a very large land area and a population estimated by the Detroit City Planning Department to be in excess of 1.2 million people.

The economics of the City are based on a largely diversified industrial and commercial structure.

The Detrex Corporation facility should not have any direct effect on any aspect of the local economic environment. The facility should not have any direct impact on local support systems such as school taxes, sewage disposal, or public utilities. Local police, fire and hospital officials have been given copies of the contingency plan for the facility to assure proper response procedures in the unlikely event of a major incident at the facility. Small incidents can be handled by in-house emergency procedures.

The service of solvent recovery (recycling) actually reduces the potential hazardous waste loading at waste disposal systems. Only a small portion of the hazardous waste material received at the facility is disposed of as hazardous waste after the material has been processed through the solvent recovery operation.

J-3 ALTERNATIVES CONSIDERED

Hazardous wastes for solvent recovery are not generated at the facility. Wastes are typically received in 55-gallon drums from off-site customers. The only feasible temporary storage facility that could be used at the facility is container and tank storage.

It is usually not cost-effective for the recovery (recycling) operation to process drummed wastes as they are received. Therefore, temporary storage of wastes is required in order to accumulate sufficient volume of a specific solvent waste prior to processing. The two hazardous waste storage tanks were formerly designated as process tanks and are critical to providing a constant material supply to the solvent recovery (recycling) process equipment. The operation would not be able to run economically without tank storage.

**J-4 ANTICIPATED ENVIRONMENTAL IMPACT
OF THE EXISTING FACILITY**

The storage areas are located within an enclosed building that provides adequate secondary containment. It is relatively free of the potential for negative impacts on topography, geology, climate, air quality, aesthetics, land use, archaeological, historical and social resources in the area.

J-4a Potential Secondary Impacts

The only potential for off-site secondary impacts to occur would be a result of mismanagement of operations that is considered under the failure mode assessment presented in a following section.

J-4b Environmental Review

The facility has been designed to minimize any potential impacts on the environment. Existing management operations and response procedures have also been designed to minimize potential impacts on the environment.

J-5 UNAVOIDABLE ADVERSE IMPACTS

There will be negligible adverse impacts from the operation of the storage areas, assuming attention is paid to site security, routine inspection and maintenance, proper containment of waste materials, and strict adherence to all applicable State and Federal regulations.

J-6 MITIGATING MEASURES

All feasible alternatives for the temporary storage of hazardous wastes at the facility have been considered. No other mitigating measures are available. The storage areas themselves are a mitigating measure that reduces the potential of a loss of hazardous waste to the environment.

J-7 FAILURE MODE ASSESSMENT

J-7a Description of System

The Detrex Corporation hazardous waste handling system consists of receiving drummed solvent wastes, temporarily storing the wastes in a secure container storage area within the single enclosed building, and ultimately processing the wastes in a solvent recovery (recycling) operation via distillation. The process system includes two re-designated hazardous waste storage tanks. The residual wastes remaining after the recovery operation are transported to an approved off-site facility.

Periodically, bulk shipments of hazardous waste are received at the facility via tanker truck. These shipments are only accepted when the particular solvent waste is being recycled so that the tanker truck inventory can be immediately transferred to the hazardous waste storage tanks and ultimately to the solvent recovery process system.

J-7b Definition of Failure

A failure within the container storage area or the tank storage area could occur as either a leakage of liquids or a leakage of vaporized liquids from the drums.

A failure during on-site transport to and from the outdoor concrete loading/unloading area could also occur as either a leakage of liquids and/or a leakage of vaporized liquids during transfer from the truck to the container or tank storage areas.

J-7c Possible Causes of Failure

Either of the potential failure modes could occur from poorly sealed drums, drums/tanks of poor structural integrity, or drums/tanks that are accidentally punctured or in some other manner damaged during handling operations; or process lines which are broken or otherwise disabled.

J-7d Methods for Detection of Failure

The possible modes of failure presented above would either be detected during regular inspections of the storage areas or immediately identified by plant personnel during transfer operations at the loading/unloading area. The storage areas are located within the single building in the vicinity of the process equipment. As such, plant personnel are in or near the storage area during all plant operating hours.

The facility inspection schedule is presented in more detail in Section F of this operating license application.

J-7e Environmental Effects of Failure

The possible modes of failure presented in previous sections could cause a release of hazardous waste onto the facility floor in the enclosed structure, or onto the concrete pad at the loading/unloading area.

The building floor, which encompasses the entire facility, is constructed of concrete with peripheral concrete curbing to provide secondary containment. All doorways are diked with concrete ramps. The peripheral concrete curbing is coated with Surewall Surface Bonding Cement Coating. There are no floor drains or other such openings in the secondary containment area. All existing expansion joints and any cracks in the building floor will be cleaned out, saw cut if necessary to provide a clean opening. Subsequently, all expansion joints and any cracks will be filled with a compatible chemically resistant flexjoint sealant. The selected sealant will be installed in accordance with the manufacturer's specification. The concrete slab and perimeter diking, with sealed joints, will serve as an impervious containment structure, thus eliminating the potential for the release of spilled liquids from within the facility.

A concrete pad directly underlies the total area where the truck sits during the unloading operation. Peripheral drive-over concrete curbing will be installed around the concrete pad. All expansion joints and any existing cracks in the concrete pad will be cleaned out, saw cut as necessary to provide a clean opening. Subsequently, all expansion joints and any cracks will be filled with a compatible chemically resistant flexjoint sealant. The selected sealant will be installed in accordance with the manufacturer's specifications. The concrete pad and peripheral concrete curbing, with sealed joints, will provide control against the contact of any potentially spilled liquids with the surrounding ground surface.

J-7f Possible Corrective Actions in the Event of Failure

A detailed description of the response actions that will be implemented in the event of a failure is presented in Section G (Contingency Plan) of this operating license application. Section G-4b(2) details the response in the event of an accidental release of liquids and Section G-4b(3) details the response in the event of an accidental release of vapors. Procedures to prevent the occurrence of hazards are described in Section F (Preparedness and Prevention Procedures).

In summary, the Preparedness and Prevention Procedures (Section F) addresses the following:

- Security and alarms
- Inspection requirements and schedule
- Emergency equipment
- Emergency prevention

The Contingency Plan addresses the following:

- Emergency Coordinators
- Notification, identification and assessment
- Control procedures
- Response Procedures
- Emergency procedures
- Evacuation plan

J-7g Human Exposure

The purpose of this evaluation is to discuss the potential magnitude and nature of the human exposure to chemicals of potential concern specifically; methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane and trichlorotrifluoroethane; resulting from accidental releases in the workplace.

The aforementioned chemicals of concern are classified as volatile organic compounds (VOCs). These chemicals are colorless liquids at room temperature which are primarily used as industrial solvents. They evaporate quickly into the air producing ether-like odours.

The most significant route of exposure is inhalation. These VOCs do not penetrate the skin to any extent. Entry into the body via dermal contact is of minimal concern since VOCs evaporate off the skin quickly and the amount absorbed is usually small unless it is trapped against the skin by clothing or gloves. If direct exposure occurred to undiluted liquid, skin irritation may result.

Exposure to VOCs can be determined by measuring levels in the breath or by monitoring a number of breakdown products (metabolites) in the urine or blood.

These particular VOCs can cause Central Nervous System (CNS) effects producing symptoms from low dose short-term exposure such as dizziness, loss of balance and coordination, sluggishness, lightheadedness, nausea and headaches. However, these symptoms disappear fairly rapidly after exposure stops. Acute exposure to high doses include eye, nose and throat irritation. This demonstrates several warning properties that personnel should be aware of that can prevent prolonged exposure that could cause long-term health impacts.

Methylene chloride, tetrachloroethylene and trichloroethylene are classified as carcinogens via inhalation route. Mice exposed to chronic low doses of methylene chloride produced lung and liver damage; trichloroethylene effects include lung damage while tetrachloroethylene effects lead to leukemia and liver lesions.

Table J-1 presents the Threshold Limit Values (TLVs) from the American Conference of Governmental Industrial Hygienists (ACGIH); the Permissible Exposure Limits (PELs) from the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA); and the Maximum Concentration Values in the workplace (MAKs) from the Deutsche Forschungsgemeinschaft (DFG), Federal Republic of Germany, Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area.

In summary, care must be taken when handling the hazardous waste solvents managed at the Detrex facility. Continued exposure to highly elevated concentrations of these solvents in air may cause long-term health impacts, however the substances have warning signs which should prevent long-term exposure

TABLE J-1
OCCUPATIONAL EXPOSURE VALUES

CHEMICAL	TOXICOLOGICAL CLASSIFICATION (6)	ACGIH TLVs (1)				OSHA PELs (1)				DFG MAKs (1)		
		TWA (2)		STEL/CEIL (3,4)		TWA (2)		STEL/CEIL (3,4)		TWA (2)	PEAK (5)	
		ppm	mg/m3	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3	
Methylene Chloride	B2	50	174			500				100	360	II,2
Tetrachloroethene	B2	50	339	200	1370	25	170			50	345	II,1
1,1,1-trichloroethane	D	350	1910	450	2460	350	1900	450	2450	200	1080	II,2
Trichloroethylene	B2	50	269	200	1070	50	270	200	1080	50	270	II,2
Trichlorotrifluoroethane		1000	7670	1250	9590	1000	7600	1250	8500	500	3800	IV

NOTES :

1) VALUES LISTED ARE THE 1990-1991 CHEMICAL SUBSTANCES THRESHOLD LIMIT VALUES (TLVs) FROM THE AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH); THE 1989 AMENDED PERMISSIBLE EXPOSURE LIMITS (PELs) FROM THE U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA); AND THE 1989 MAXIMUM CONCENTRATION VALUES IN THE WORKPLACE (MAKs) FROM THE DEUTSCHE FORSCHUNGSGEMEINSCHAFT (DFG), FEDERAL REPUBLIC OF GERMANY, COMMISSION FOR THE INVESTIGATION OF HEALTH HAZARDS OF CHEMICAL COMPOUNDS IN THE WORK AREA.

2) TWA = TIME WEIGHTED AVERAGE EXPOSURE CONCENTRATION FOR A NORMAL 8-HOUR (TLV,PEL).

3) STEL = SHORT-TERM EXPOSURE LIMIT. USUALLY A 15 MINUTE TIME-WEIGHTED AVERAGE (TWA) EXPOSURE THAT SHOULD NOT BE EXCEEDED AT ANY TIME DURING A WORKDAY, EVEN IF THE 8-HOUR TWA IS WITHIN THE TLV-TWA OR PEL-TWA.

4) CEIL = THE CONCENTRATION THAT SHALL NOT BE EXCEEDED DURING ANY PART OF THE WORKING EXPOSURE.

5) MAK PEAK EXPOSURE LIMITATION CATEGORIES

- I LOCAL IRRITANTS
- II SUBSTANCES WITH SYSTEMIC EFFECTS
 - ONSET OF EFFECT <= 2 h
 - II,1 HALF LIFE < 2 h
 - II,2 HALF LIFE 2 h
- III SUBSTANCES WITH SYSTEMIC EFFECTS
- IV SUBSTANCES ELICITING VERY WEAK EFFECTS
 - MAK > 500 ml/m3
- V SUBSTANCES HAVING INTENSIVE ODOR

6) EPA WEIGHT OF EVIDENCE RATING CONTAINED IN IRIS, JANUARY 14, 1991.

B2 PROBABLE HUMAN CARCINOGEN (SUFFICIENT EVIDENCE IN ANIMAL STUDIES)

ATTACHMENTS

ATTACHMENT J-1

SITE LOCATION



SITE LOCATION
Detrex Corporation
Eaton Avenue Facility, Detroit

ATTACHMENT J-2

TERRESTRIAL SYSTEMS

TERRESTRIAL SYSTEMS
DETREX CORPORATION - GOLD SHIELD SOLVENTS FACILITY
DETROIT, MICHIGAN

The Gold Shield Solvents Facility is located in an industrial zone in Northwest Detroit. The study area surrounding the Facility, as shown in the accompanying map, includes residential, commercial, and industrial sectors, as well as a large park and a cemetery. The area was studied on August 1, and 2, 1988.

TERRESTRIAL SYSTEMS

FLORA:

There are no natural plant communities in the usual sense within the study area, with flora being determined by land use within each sector.

Within the industrial (and commercial) zone, which includes the 0.9 acre Gold Shield Solvents Facility, virtually all flora are pioneer species, characterized by their ability to become established on very poor soil under very harsh conditions. Herbacious plants identified in this area include grasses, Yellow Nut Sedge, Milkweed, Goldenrod, Chicory, and Morning Glory. Woody plants, mostly under 5 feet in height, include Cottonwood, Box Elder, Chinese Elm, Sycamore, Mulberry, Raspberry, and Virginia Creeper. Virtually all plant life within the industrial sector occurs as "weedy" growth along fences, railroad tracks, and in out of the way corners. It is apparently cut and sprayed with herbicide regularly. Except for a very few Cottonwoods and Box Elders, no plants seem to be over 2 years old, and provide no animal habitat.

Within the residential area, flora consists of well maintained lawns, and introduced trees and shrubs. The shade trees, mostly Ash, Norway Maple, and Linden, range from 4" to 16" in diameter, and appear to range up to about 40 years in age.

The Butzel playground which lies within the study area is almost entirely grass, except for a few shade trees in the area and around the perimeter.

The cemetery contains an array of plant species similar to that of the residential area, but includes a few somewhat older trees, up to 24" trunk diameter, estimated to be 60 to 70 years old.

FAUNA

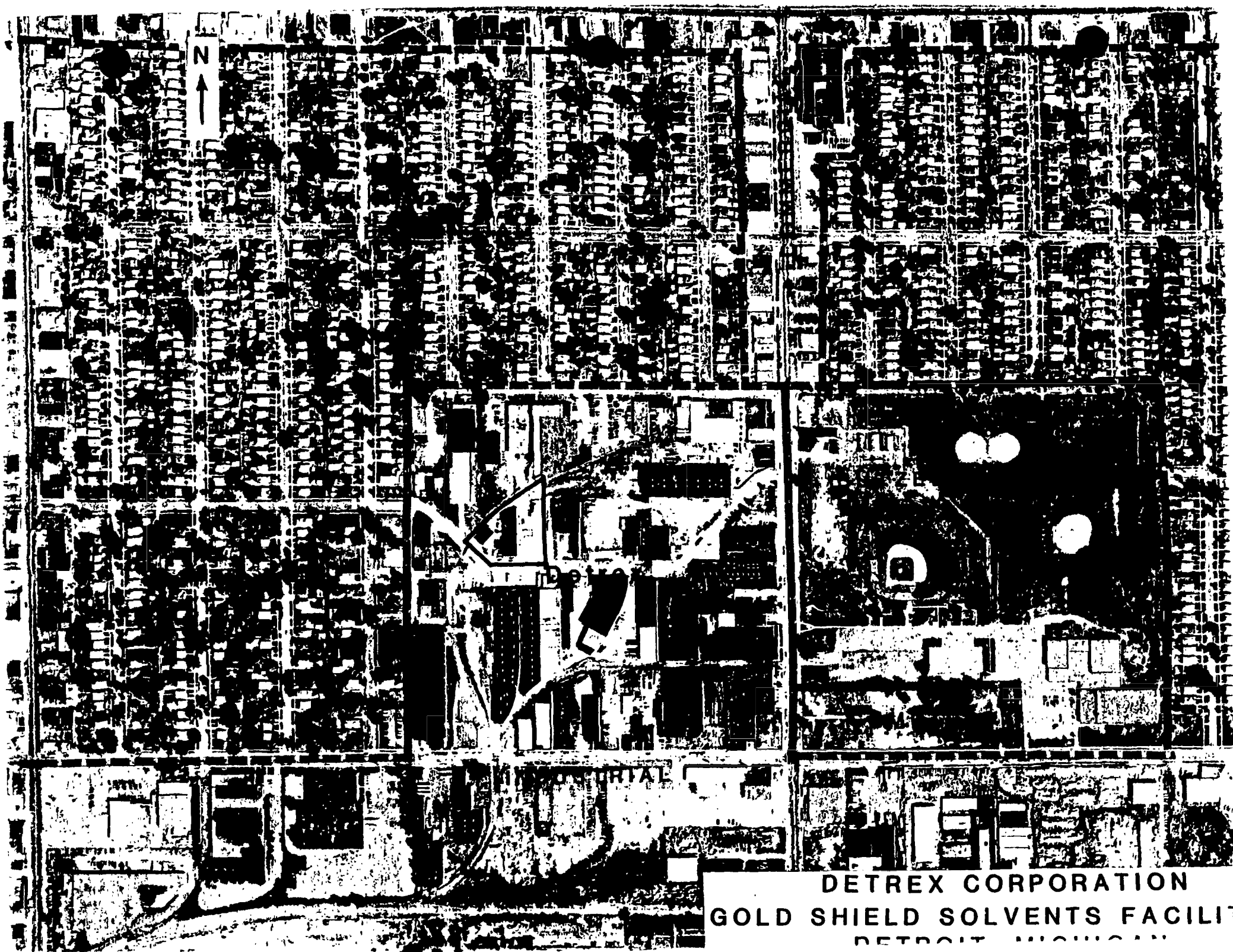
While no animal life was observed, the residential areas could be expected to support populations of various songbirds and probably squirrels.

Due to the highly developed and intensely used nature of the study area, it is highly unlikely that any rare or endangered species exist in the vicinity.

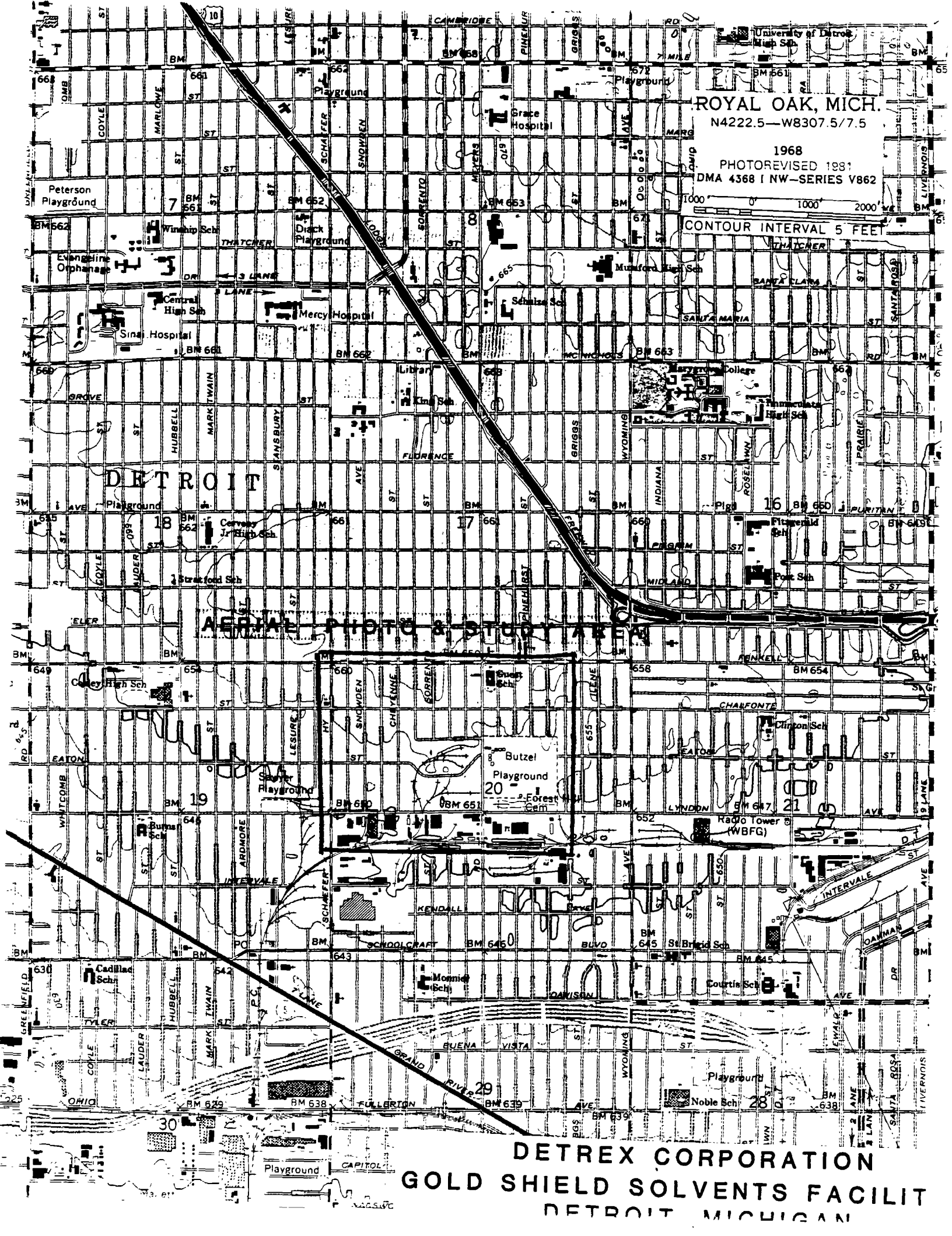
AQUATIC SYSTEMS

There are no aquatic systems of any kind within the study area.

Robert Cobb, M.S.
Environmental Consultants, Inc.



DETREX CORPORATION
GOLD SHIELD SOLVENTS FACILITY
DETROIT, MICHIGAN



ROYAL OAK, MICH.
N4222.5—W8307.5/7.5

1968
PHOTOREVISED 1981
DMA 4368 I NW—SERIES V862

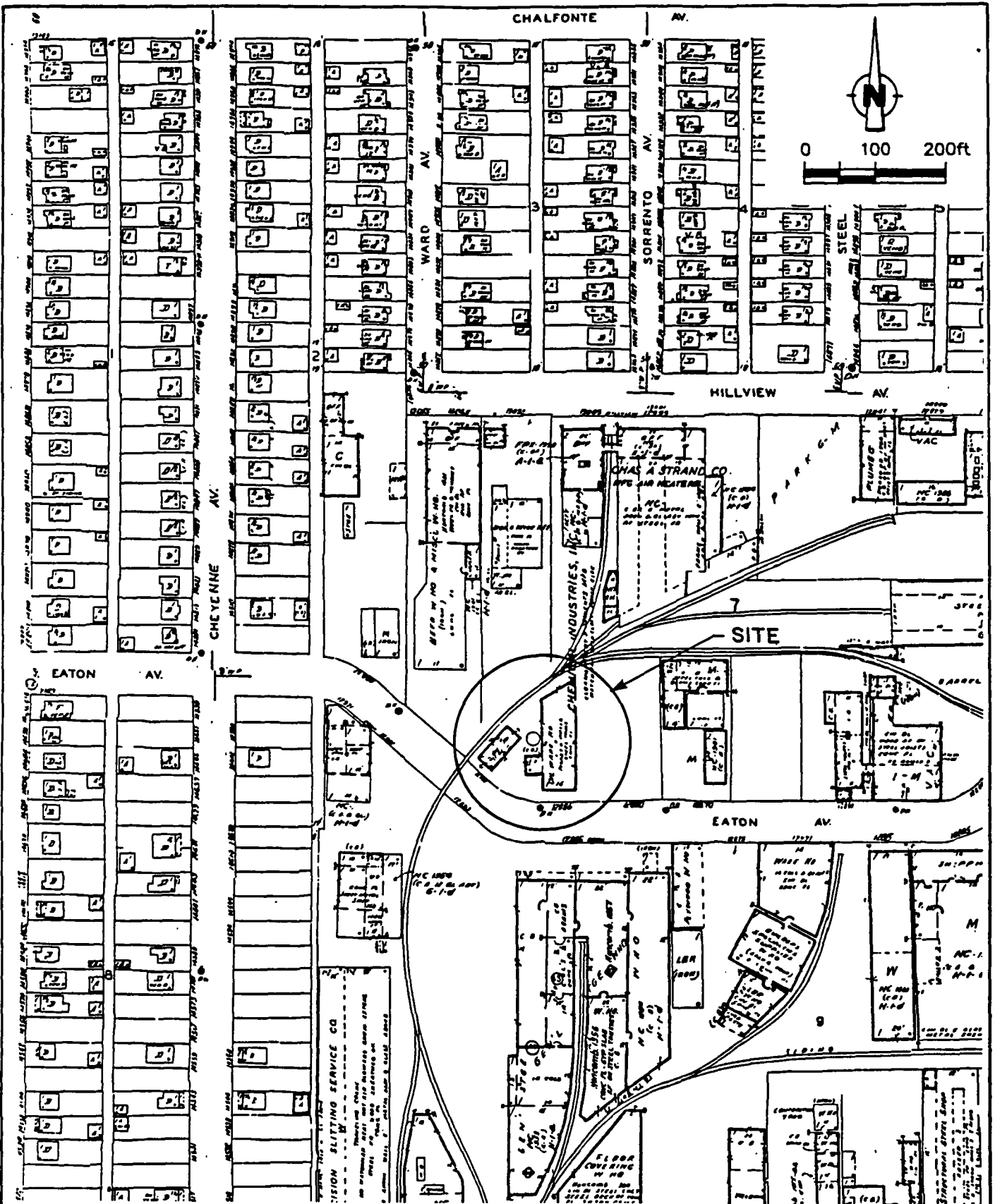
CONTOUR INTERVAL 5 FEET

AERIAL PHOTO & STUDY AREA

DETREX CORPORATION
GOLD SHIELD SOLVENTS FACILIT
DETROIT MICHIGAN

ATTACHMENT J-3

LAND USE



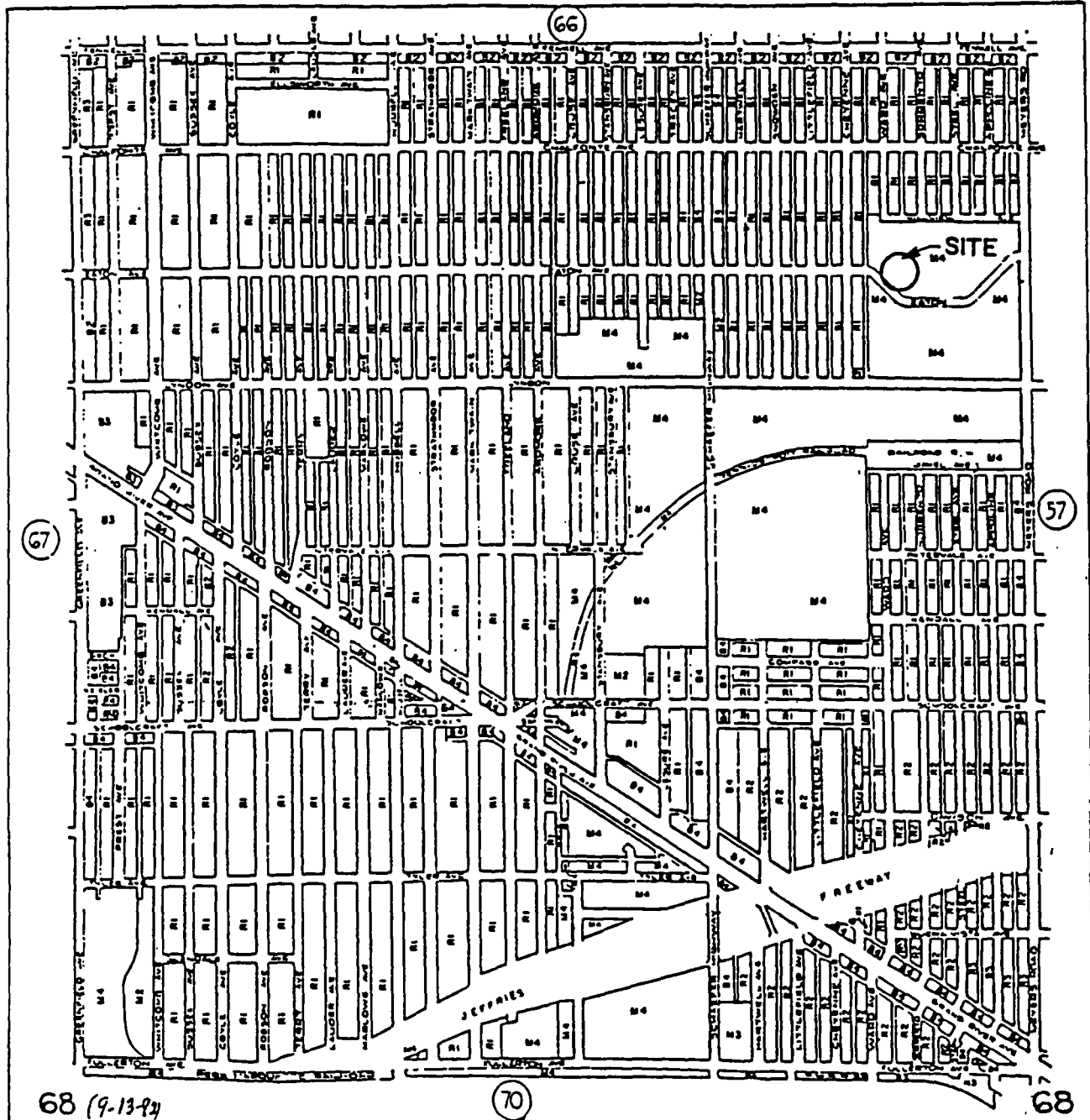
SURROUNDING LAND USE
Detrex Corporation
Eaton Avenue Facility, Detroit

CRA

ATTACHMENT J-4

ZONING

DETROIT ZONING ORDINANCE



CRA

ZONING MAP
Detrex Corporation
Eaton Avenue Facility, Detroit

ATTACHMENT J-5

**CORRESPONDENCE
BUREAU OF HISTORY**

MICHIGAN DEPARTMENT OF STATE

RICHARD H. AUSTIN

SECRETARY OF STATE



LANSING

MICHIGAN 48918

BUREAU OF HISTORY

ADMINISTRATION, PUBLICATIONS
ARCHAEOLOGY AND HISTORIC
PRESERVATION

208 N. Capitol Avenue
517-373-0510

STATE ARCHIVES

3405 N. Logan Street
517-335-9165

MICHIGAN HISTORICAL MUSEUM

208 N. Capitol Avenue
517-373-3559

August 10, 1988

Mr. Bruce McConnell, B.A.S.C.
Conestoga-Rovers & Associates Limited
651 Colby Drive
Waterloo, Ontario, Canada N2V 1C2

RE: ER-88468 Environmental Assessment-Detrex Corporation Gold Shield Solvents
Facility, Detroit, Wayne County

Dear Mr. McConnell:

We have reviewed the above-cited project which includes the above-cited site(s) under authority of the National Historic Preservation Act of 1966, as amended. It is the opinion of the State Historic Preservation Officer (SHPO) that the site(s) is not eligible for listing in the National Register of Historic Places. It is, therefore, further the opinion of the SHPO that this project will not affect any historic properties and is cleared under Federal Regulation 36 CFR 800 for the "Protection of Historic Properties."

Please maintain a copy of this letter with your environmental review record for this project. Should the scope of work change in any way, or if artifacts or bones are discovered, contact this office immediately. This letter evidences your compliance with 36 CFR 800.4 "Identifying Historic Properties," and the SHPO hereby waives your responsibility to notify this office under 36 CFR 800.4(d) with a determination of "No Historic Properties Found."

If you have any questions, please contact Robin S. Peebles, Environmental Review Coordinator, at (517) 335-2721. Thank you for this opportunity to review and comment.

Sincerely,

Martha M. Bigelow
Director, Bureau of History
and
State Historic Preservation Officer

by:

A handwritten signature in cursive script, reading "Kathryn B. Eckert".

Kathryn B. Eckert, Deputy
State Historic Preservation Officer
Bureau of History

MMB/KBE/JRH/BDC/RSP/cc

Date: 06/24/91
Revision: 91-1
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SECTION K

MANIFESTING, RECORDKEEPING AND REPORTING

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SECTION K
MANIFESTING, RECORDKEEPING AND REPORTING

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SECTION K

MANIFESTING, RECORDKEEPING AND REPORTING

K-1 MANIFEST SYSTEM [299.9608]

Detrex accepts only properly manifested hazardous wastes for storage in the Eaton Avenue TSD facility. Detrex also is a licensed hazardous waste transporter with several vehicles that transport wastes to the Eaton Avenue facility.

Upon receipt of a hazardous waste shipment at the Eaton Avenue facility, the following procedures are followed:

- 1) The waste shipment paperwork including manifest and land ban notification and other DOT paperwork requirements are reviewed for completeness;
- 2) The wastes are sampled, in accordance with the waste analysis plan;
- 3) Waste screening is conducted to confirm the acceptability of the waste material;
- 4) Upon approval, the manifest is signed and dated;
- 5) Detrex retains their copy and the transporters copy of the manifest (unless Detrex is not the transporter in which case the transporter is provided with one signed copy of the manifest);
- 6) Within 30 days, a signed copy of the manifest is returned to the original generator;
- 7) A monthly report is submitted to the Director within 10 days after the end of each month providing copies of all signed manifests from the previous month; and
- 8) A copy of each manifest is maintained at the facility for a period of at least three years.

Any discrepancies found in the manifest are noted appropriately and steps taken to reconcile the discrepancy with the original waste generator. In the event a discrepancy can not be resolved within

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15 days, Detrex will submit, to the director and regional administrator, a letter describing the discrepancy and attempts to reconcile it and a copy of the manifest.

K-2 RECORD KEEPING [299.9609]

Detrex maintains an operating record within the office of the facility. This operating record includes a copy of this Operating License Application and related correspondence. The operating record, including the information described below, will be maintained until closure of the facility.

The operating record includes at a minimum the following:

- 1) A description and quantity of all wastes received for recovery and a designation for container or tank storage including cross-reference to appropriate manifest document number and dates of receipt;
- 2) A copy of all manifests signed by the facility for at least 3 years;
- 3) Records and results of all waste analyses conducted including preliminary characterization, waste screening and annual waste re-characterization;
- 4) Copies of the Contingency Plan, acknowledgement agreements and reports generated as a result that the Contingency Plan is required to be implemented;
- 5) Inspection reports are maintained on file for at least 3 years;
- 6) A record of any waste shipments rejected by the facility;
- 7) Personnel and personnel training records for all former employers for at least 3 years and records for current employees until closure;
- 8) A copy of the most recent closure cost estimate and copy of financial assurance for closure;
- 9) Any related correspondence or reports submitted to or received from the Director relating to the TSD operation at the Eaton Avenue facility; and
- 10) All monitoring, testing, or analytical data required by the operating license notices to generators referenced in 40 CFR §264.12(b) will be maintained until closure.

K-3 REPORTING

All required reports are prepared and submitted by Detrex Corporation. All reports will be signed and certified in accordance with the provisions of 40 CFR §270.11.

K-3a Biennial Report

Detrex will submit a biennial report by March 1 of each even numbered year to the Regional Administrator. The report will be submitted on form 8700-13B and provide all information required on the form.

This information includes:

- 1) The EPA identification number, name, and address of the facility;
- 2) The calender year covered by the report;
- 3) A listing of EPA identification numbers for each hazardous waste generator from which wastes were received and for imported shipments, if any, the name and address of the foreign generator;
- 4) A description and quantity of each hazardous waste received during the year including EPA identification number of the generator;
- 5) The method of storage (i.e. container or tank) for each hazardous waste; and
- 6) The most recent closure cost estimate under R 299.9702.

K-3b Unmanifested Waste Report

Detrex does not accept regulated wastes that are not properly manifested. Should this occur, a report will be provided to the director within 15 days after receiving the waste.

The Unmanifested Waste Report will include:

- 1) The EPA identification number, name, and address of the facility;

- 2) The date the facility received the waste;
- 3) The EPA identification number, name, and address of the generator and the transporter, if available;
- 4) A description and the quantity of each unmanifested hazardous waste and facility received;
- 5) The method of treatment, storage, or disposal for each hazardous waste;
- 6) The certification signed by the owner or operator of the facility or the owner or operator's authorized representative; and
- 7) A brief explanation of why the waste was unmanifested, if known.

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Revision: 91-1
Page: L-1

SECTION L

LOCATION STANDARDS, FACILITY DESIGN AND OPERATING STANDARDS

SECTION L

LOCATION STANDARDS, FACILITY DESIGN AND OPERATING STANDARDS

L-1 LOCATION STANDARDS [R299.9603]

Since the Detrex Corporation TSD facility for which this Operating License Application is being submitted is an existing facility and no new regulated treatment, storage, or disposal facilities or expansions, enlargements, or alterations are being considered, the location standards of this rule do not apply.

Nevertheless, the facility is not located in the vicinity of a fault, a floodway, a coastal area, nor over a sole-source aquifer, or near a public water supply. The waste management area is located approximately 75 feet from the nearest property line (to the north), however it is over 130 feet to the nearest building (to the east). Based on the operation at the Eaton Avenue facility, this is considered an adequate separation distance.

L-2 FACILITY DESIGN AND OPERATING STANDARDS [R299.9604]

The Detrex Corporation TSD facility is an existing facility and should therefore be exempt from the requirements of this rule.

However, the entire hazardous waste container and tank storage areas are located within an enclosed building which is provided with adequate secondary containment. Thus, run-on and run-off management systems are not required for the regulated units. Additionally, the outdoor loading/unloading area secondary containment system has been designed for the 24-hour 100-year rainfall event.

Therefore, the facility has been designed and is operated to prevent hazardous waste constituents from escaping into the soil, surface water, groundwater, drains or sewers.

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SECTION M
CERTIFICATION OF CAPABILITY

SECTION M

CERTIFICATION OF CAPABILITY

I certify under penalty of law that, based upon my review of the information presented in this document, and my inquiry of those directly responsible for gathering this information, to the best of my knowledge and belief the Detrex Corporation Solvents and Environmental Services Division facility located at 12886 Eaton Avenue in Detroit Michigan is capable of processing (i.e. solvent recovery) and storing hazardous wastes in accordance with the applicable environmental, human health, location and facility design and operating standards outlined in Part 6 of the Michigan Act 64 Rules. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Certified By:

Signature:

Name:

Company:

Issa H. Shamiyeh
Issa H. Shamiyeh
Detrex Corporation

Professional Engineer

Registration No.

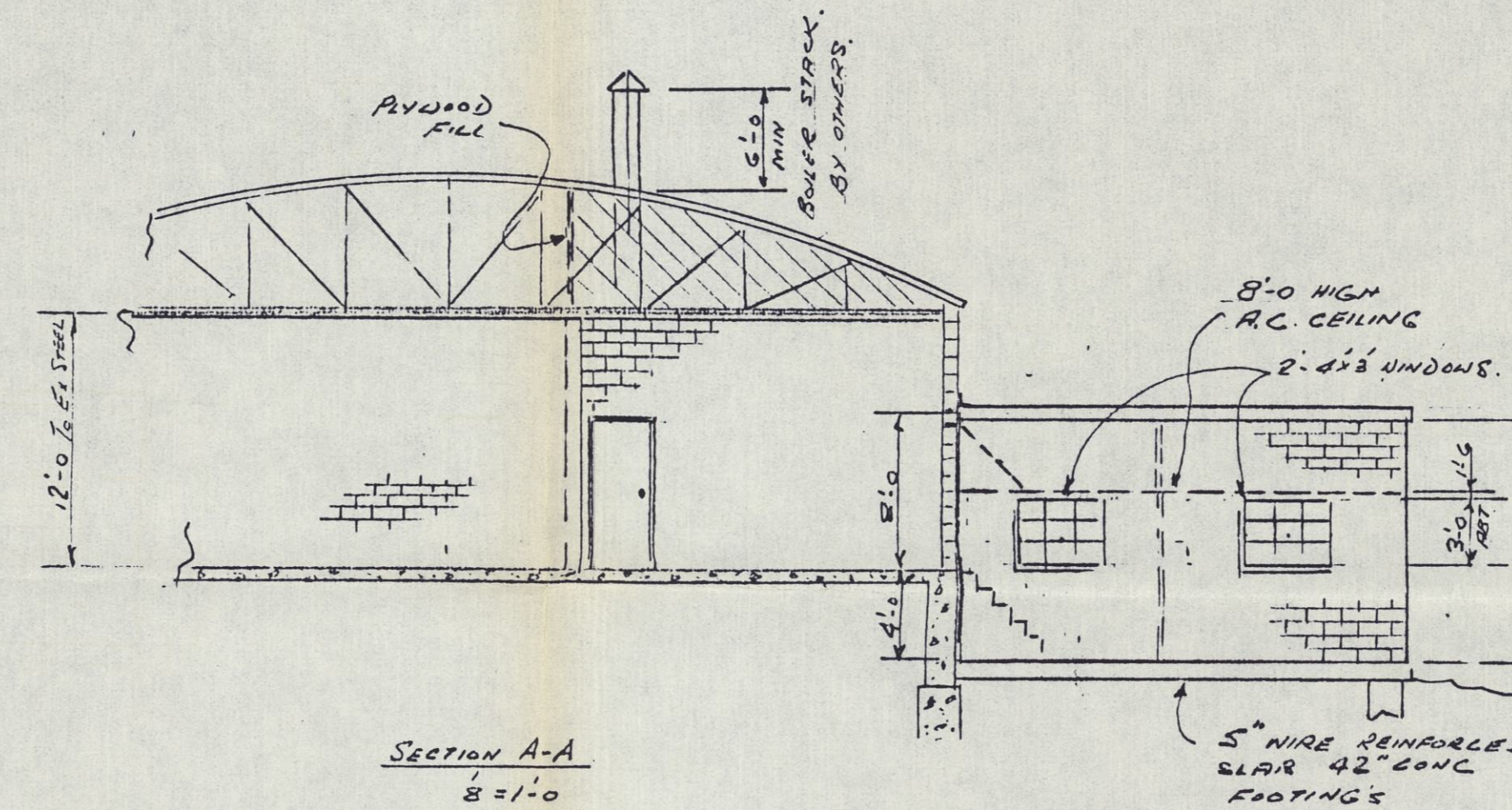
11 222

State:

Michigan

Date:

6/21/1991



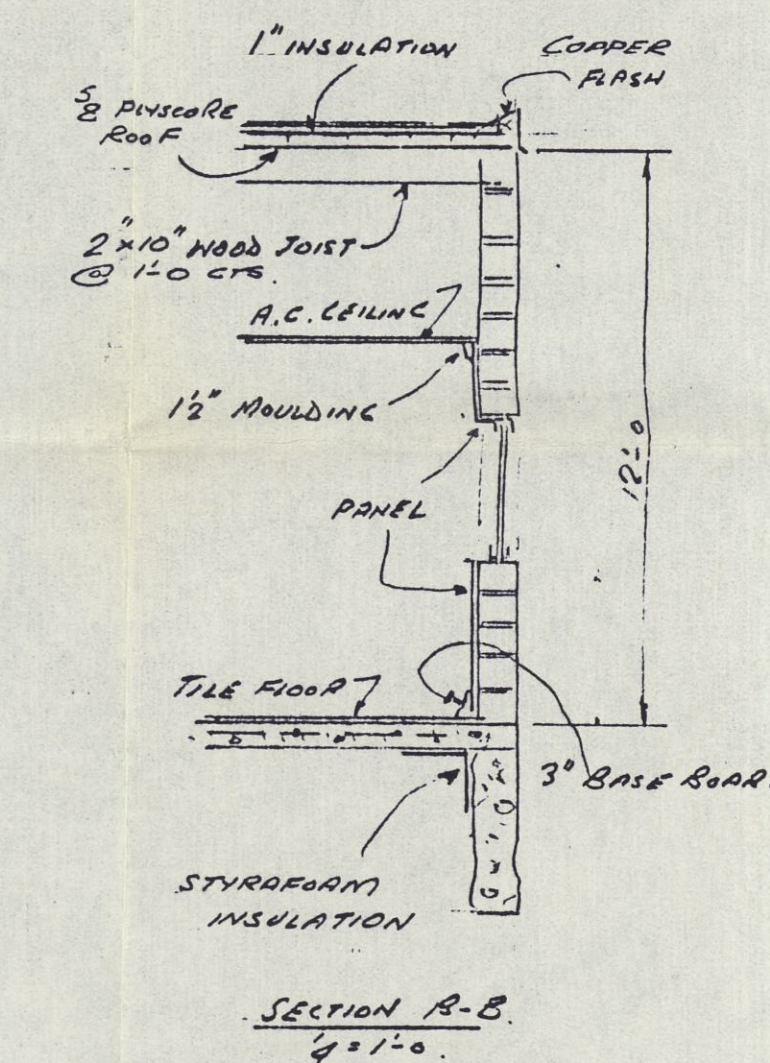
SECTION A-A
8 = 1'-0"

OFFICE ADDITION

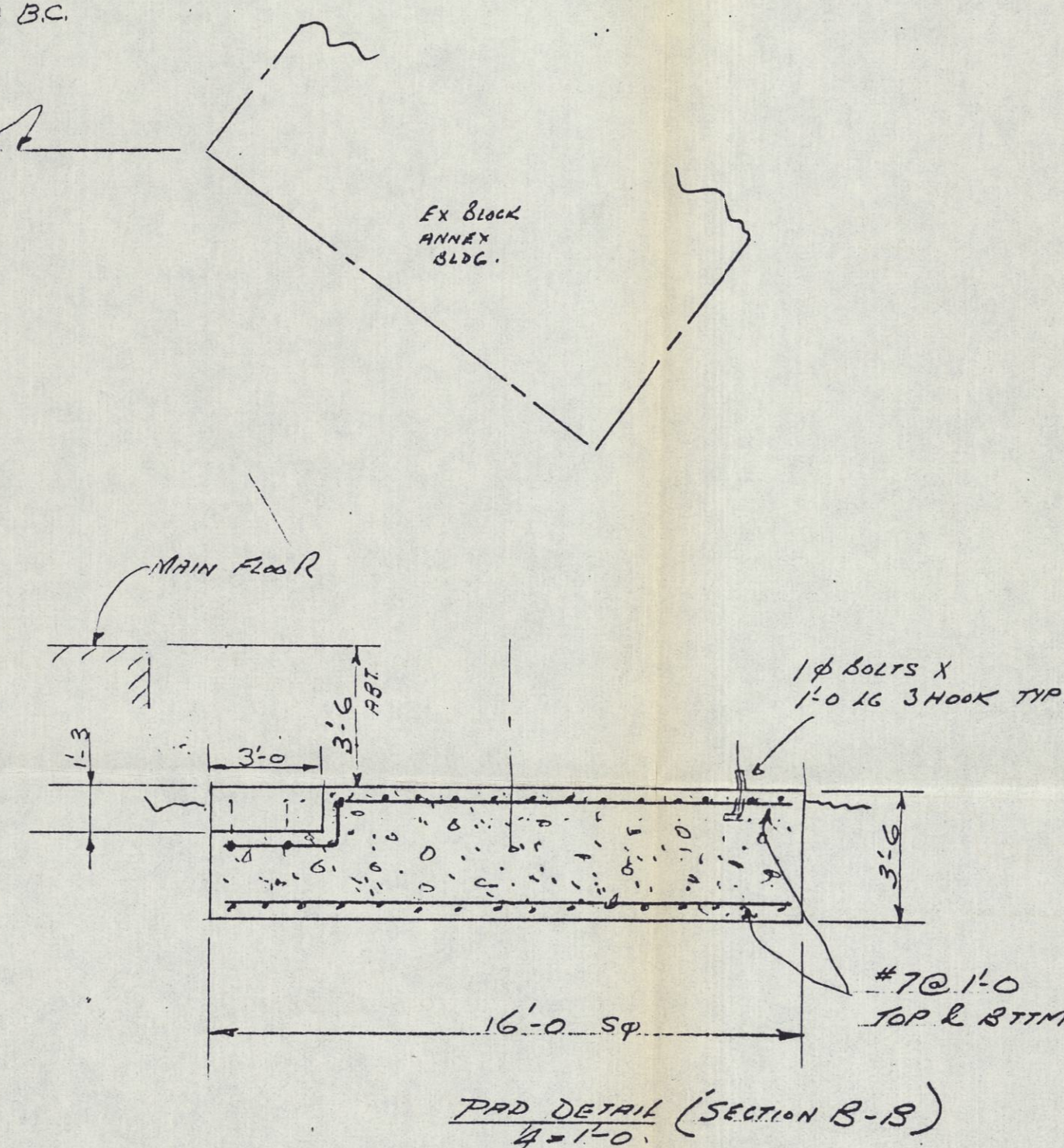
- 1/ OUTSIDE WALLS 8" BLOCK
- 2/ WASHROOM WALLS 8" BLOCK
- 3/ PARTITION WALLS - 2x4 STUD.
- PLUMBED, PANGES WHERE NEEDED THIS KEY OTHERS WALLS. DRYBOARD OR BLOCK.
- 4/ 3/4 PLYSCRE ROOF ON WOOD JOISTS.
- 1" INSULATION 20 YEAR ROOF.
- COPPER FLASH.
- 5/ INTERIOR STAIR LIGHTING
- BEHIND TRANSPARENT CEILING (BY OTHERS)
- PANGES - 2 POWER OUTLETS
- PER OFFICE - 1 IN STORE ROOM (IN EA. WASHROOM)
- 6/ SUSPENDED ACOUSTIC CEILING 8'0 HIGH.
- 7/ ALL INSIDE & OUTSIDE WALLS NOT
- PANNELED TO BE PAINTED.
- OFF WHITE INSIDE
- LIGHT GREEN OUTSIDE.
- 8/ MECHANICALS TO INCLUDE WATER
- PUMP/ TANK & 1/2" WATER LINE IN.
- 9/ RUMMINT STAIN WINDSH.
- 10/ ALL FLOORS VINYL TILED.
- 11/ 22'0 LENGTH OF GUTTER
- OVER ENTRANCE DOOR

HEATING & AIR CONDITIONING BY OTHERS

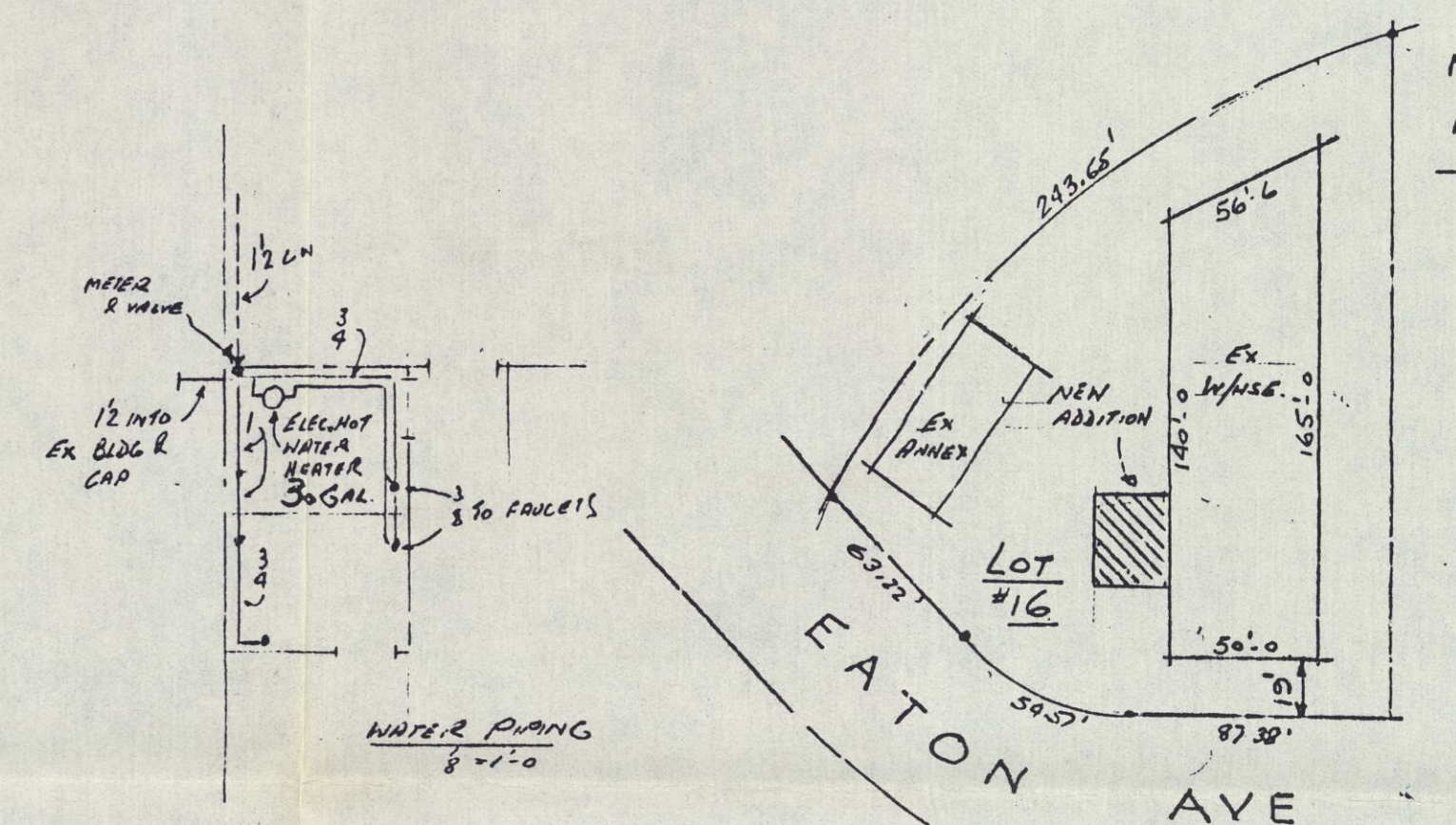
- 1/ HEAT BY HOT WATER UNITS
2 PIPE.
- 2/ 2 1/2 TON AIR COND
RECIRCULATE 95% AIR
& USE 5% OUTSIDE MAKEUP
FOR OFFICES
- 3/ VENTILATE REL. ROOM
WITH TWO WALL MTG
FANS. TOTAL 2800 CFM.



SECTION B-C
421'-0.



PAV DETAIL (SECTION B-B)
4-1-0.



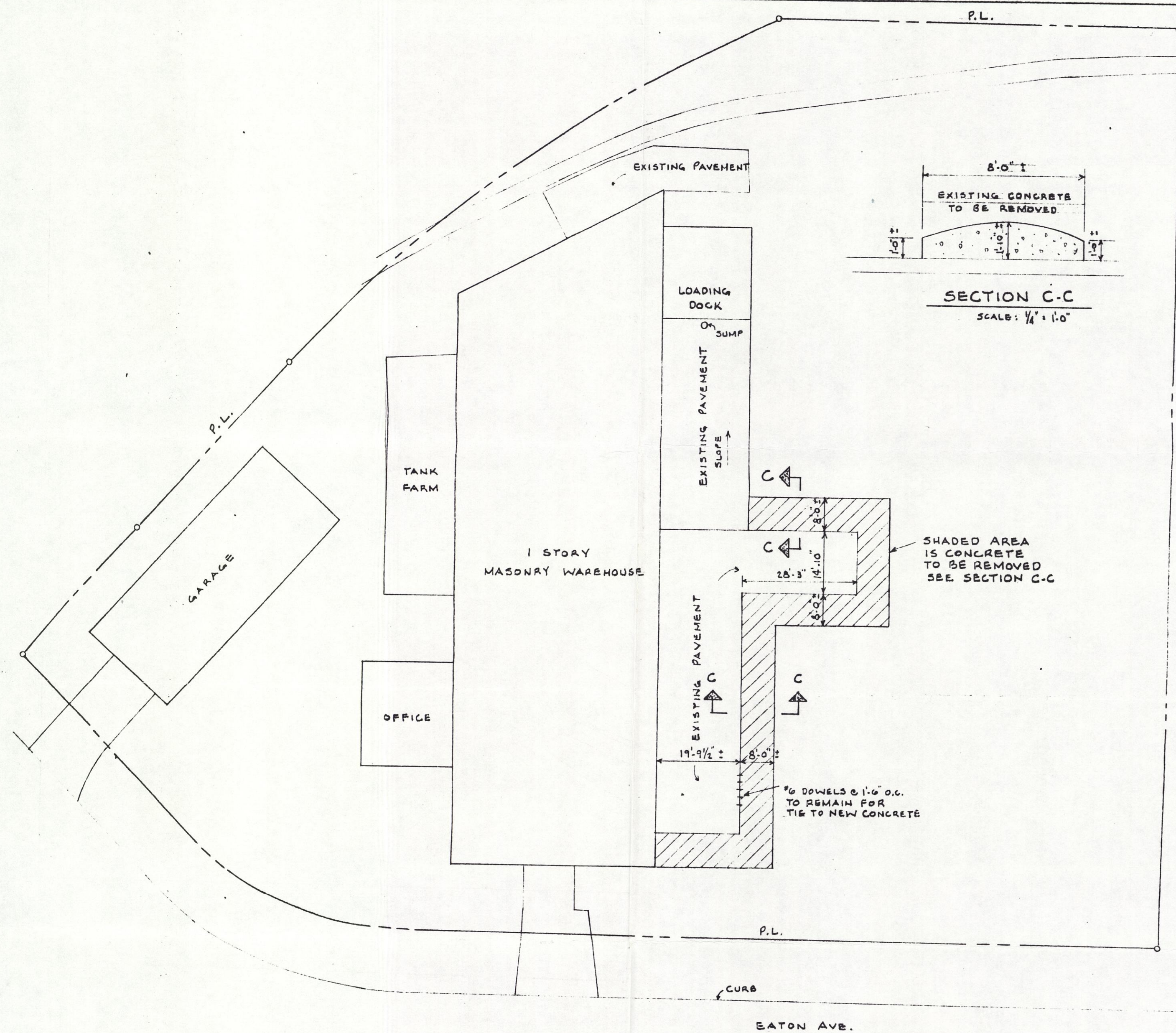
PLOT PLAN
1" = 60' = 0

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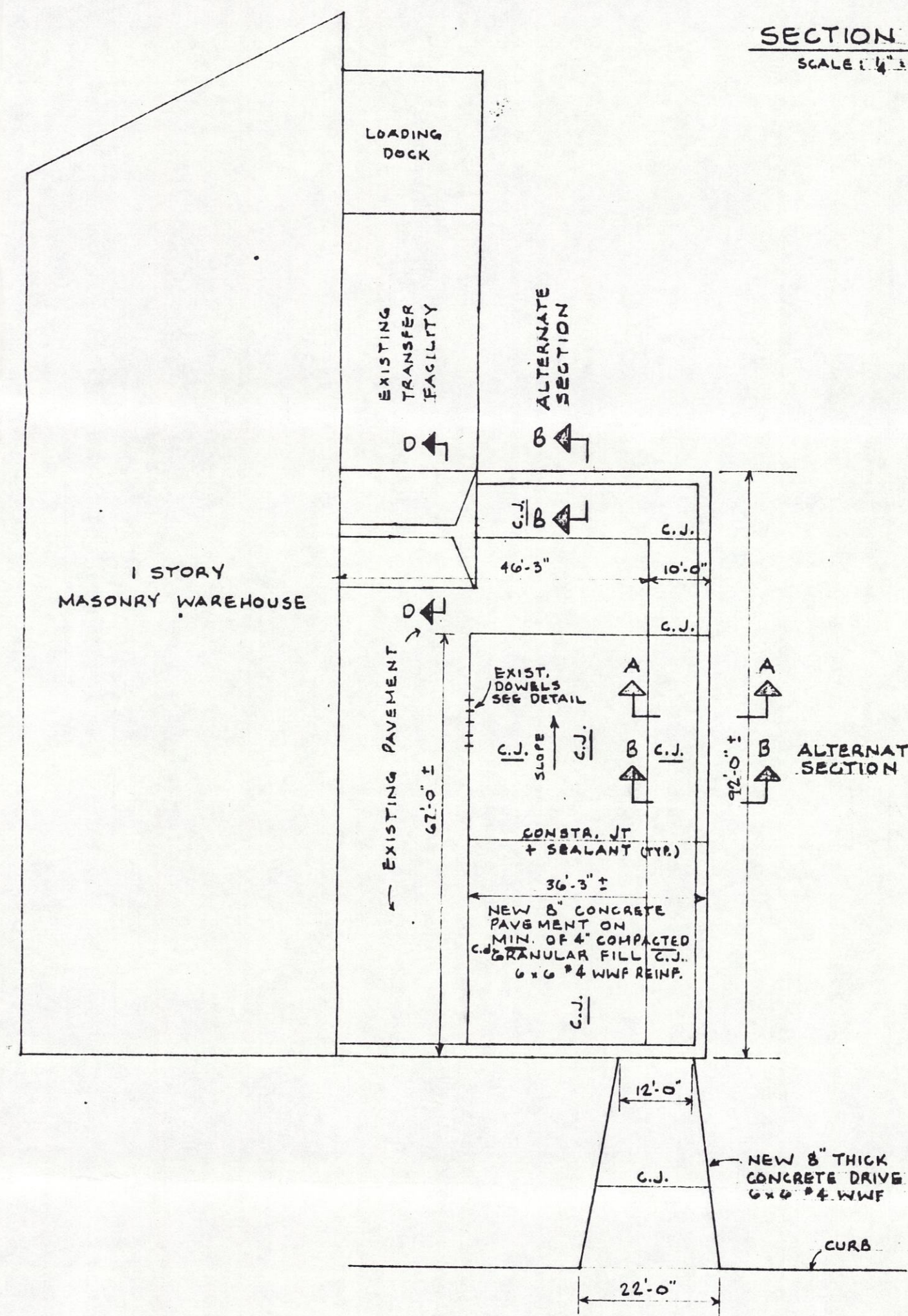
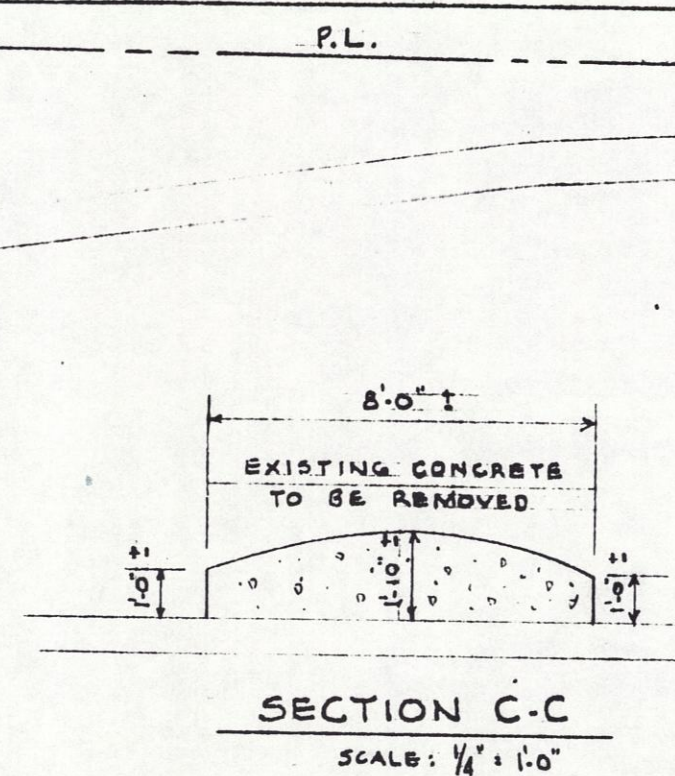
JUN 26 1991
Waste Management
Division

Division
Lot 16
Eaton Ave.
12886 Eaton

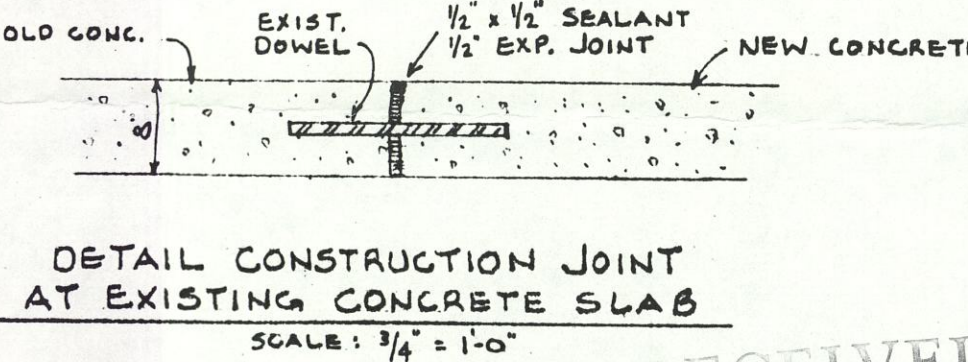
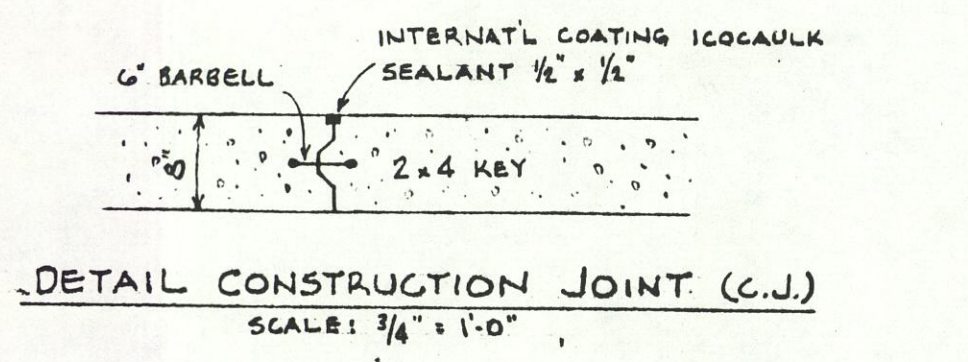
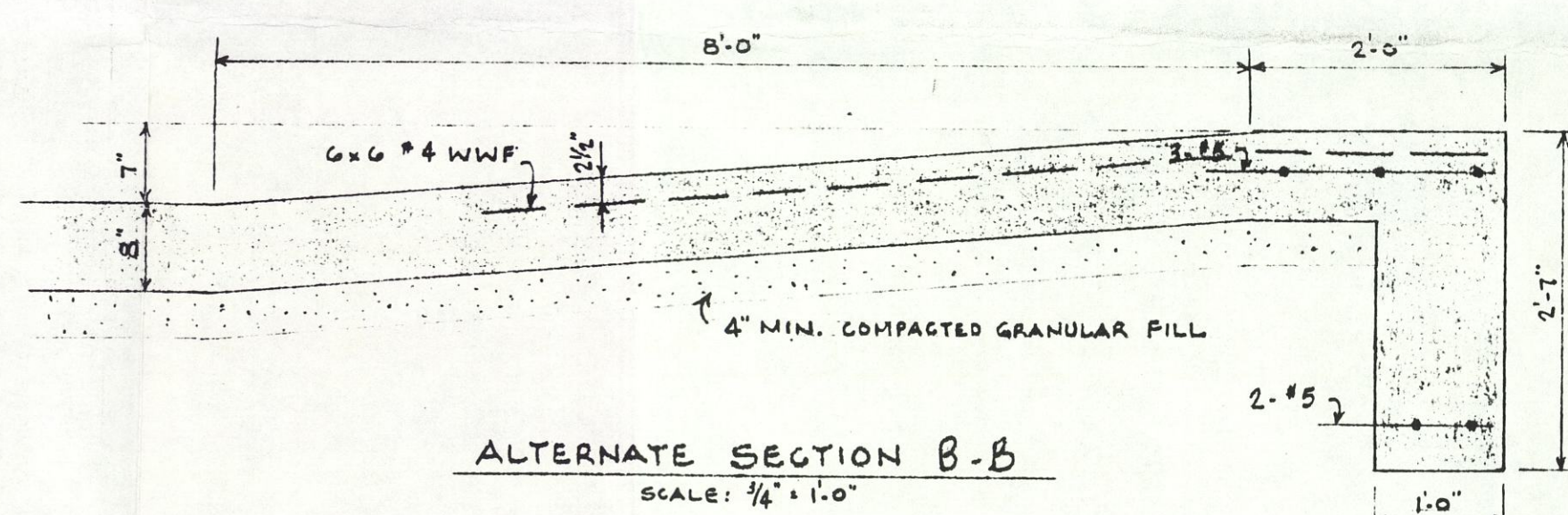
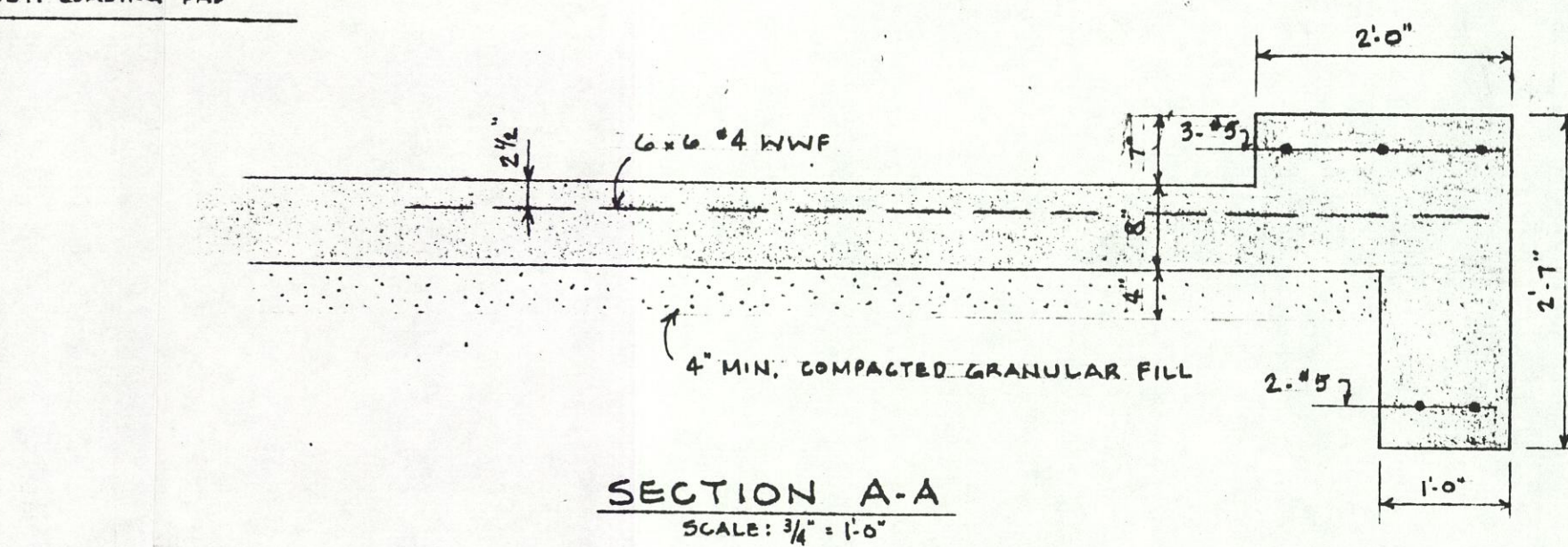
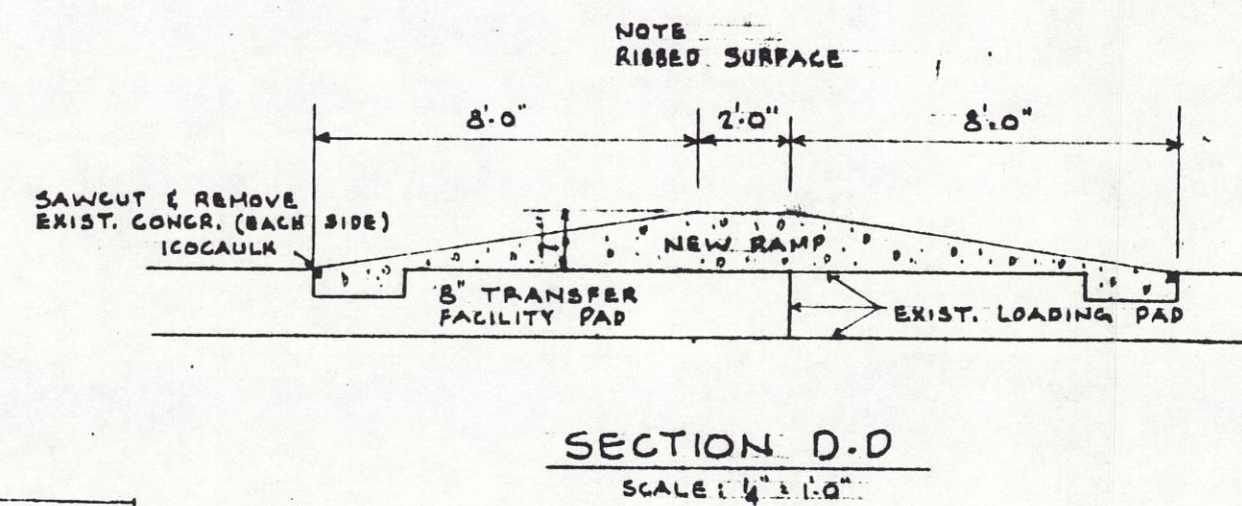
DATE	REV. NO.	CHANGE RECORD	BY	DATE	REV. NO.	CHANGE RECORD	BY	DR.	DETREX CHEMICAL INDUSTRIES, INC.		PROJECT NO.
								CK.	PROJECT ENGINEERING DEPARTMENT DETROIT, MICHIGAN 48232		
								APR.	NEW GOLD SHIELD RECLAMATION		DWG. NO.
								SCALE	DATE	ADDITION	
				1/25/11	①	ADD. TR. FANT	DUL	NOTED.	FRT/CC		E-65-G-100



SITE PLAN SHOWING REMOVAL OF CONCRETE
SCALE: 1" = 20'



PLAN SHOWING NEW CONCRETE
SCALE: 1" = 20'



GENERAL NOTES

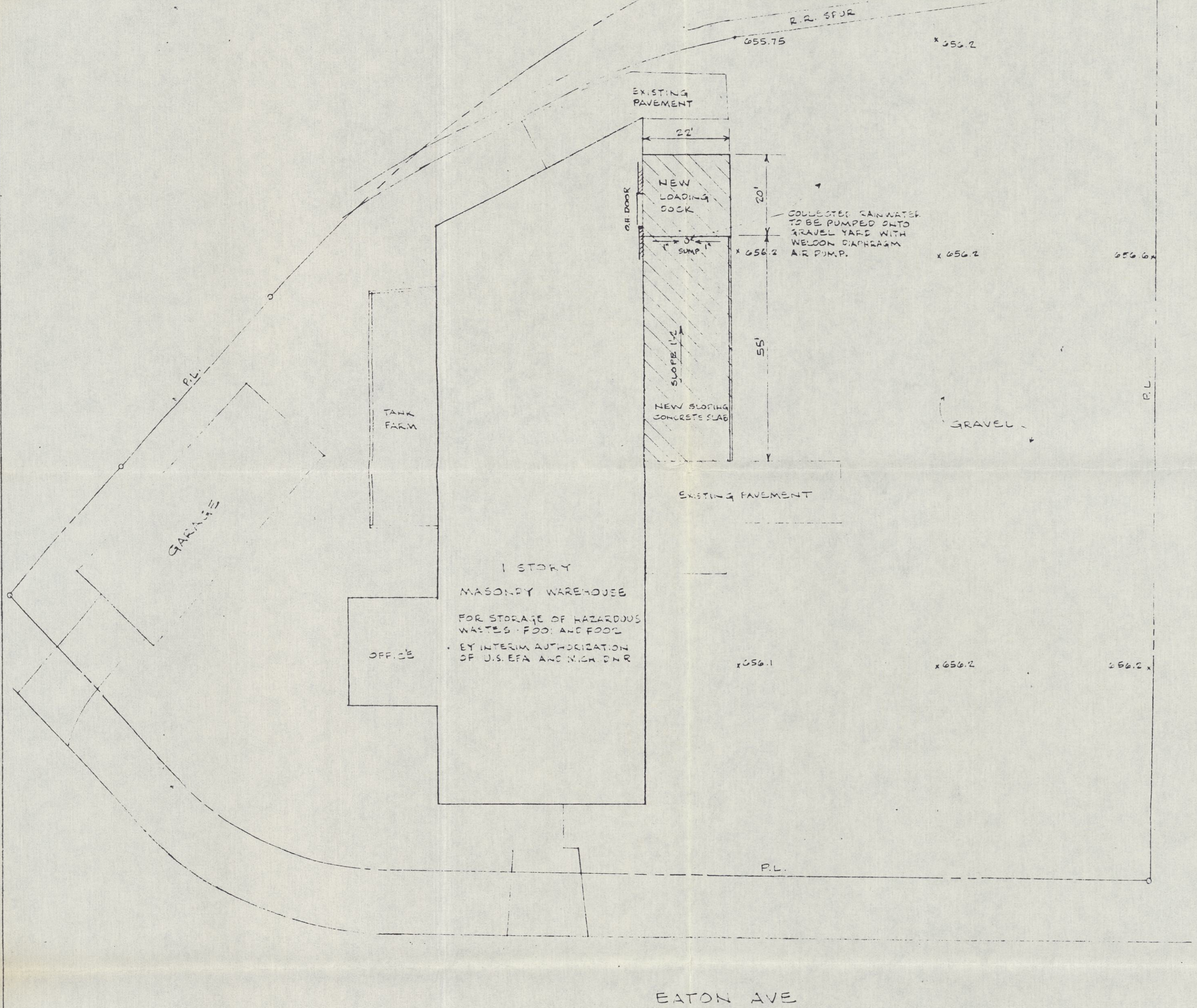
All concrete shall have a minimum compressive strength of 4000 psi at 28 days, be air entrained, and have a minimum of 6 sacks of cement. All reinforcing steel shall be new billet steel deformed bars conforming to Standard Specification ASTM A615 Grade 60; deformations ASTM A305. Lap adjacent sheets of welded wire fabric one space plus 2". All granular backfill shall be thoroughly compacted to 95% of its standard Proctor maximum dry density. Prior to depositing any fill material, thoroughly compact the existing surface with power rollers. Sealant at construction joints to be International Coating Icocalk. Verify all dimensions at site. Grades to be established in field.

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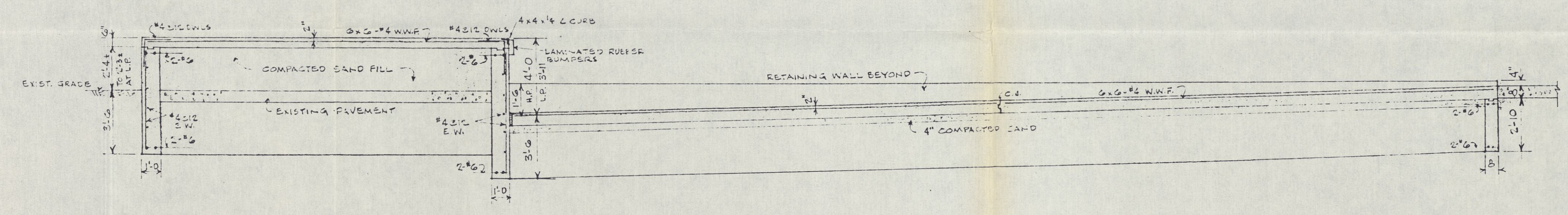
LOADING AREA CONTAINMENT STRUCTURE FOR GOLD SHIELD SOLVENTS DIVISION OF DETREX CORPORATION 12886 EATON AVE. DETROIT, MICHIGAN	
COMM. No. 91-1183	DRWG No. 11 OF 11
DATE AUG. 15, 1991	ROBERT J. DAVIS, P.E. CONSULTING ENGINEER 2410 BARK TOWER DETROIT, MICHIGAN 48226



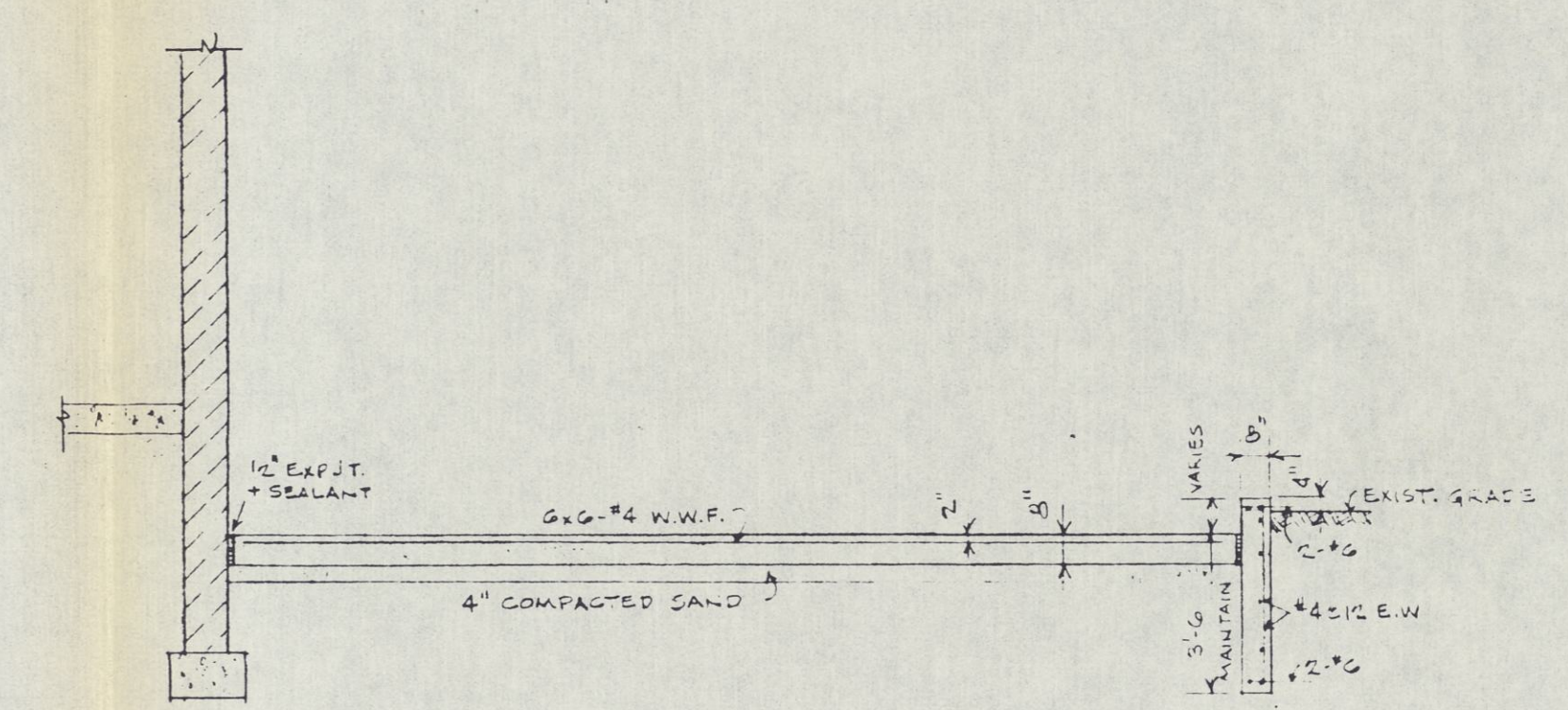
SITE PLAN
SCALE: 1"=20'

GENERAL NOTES

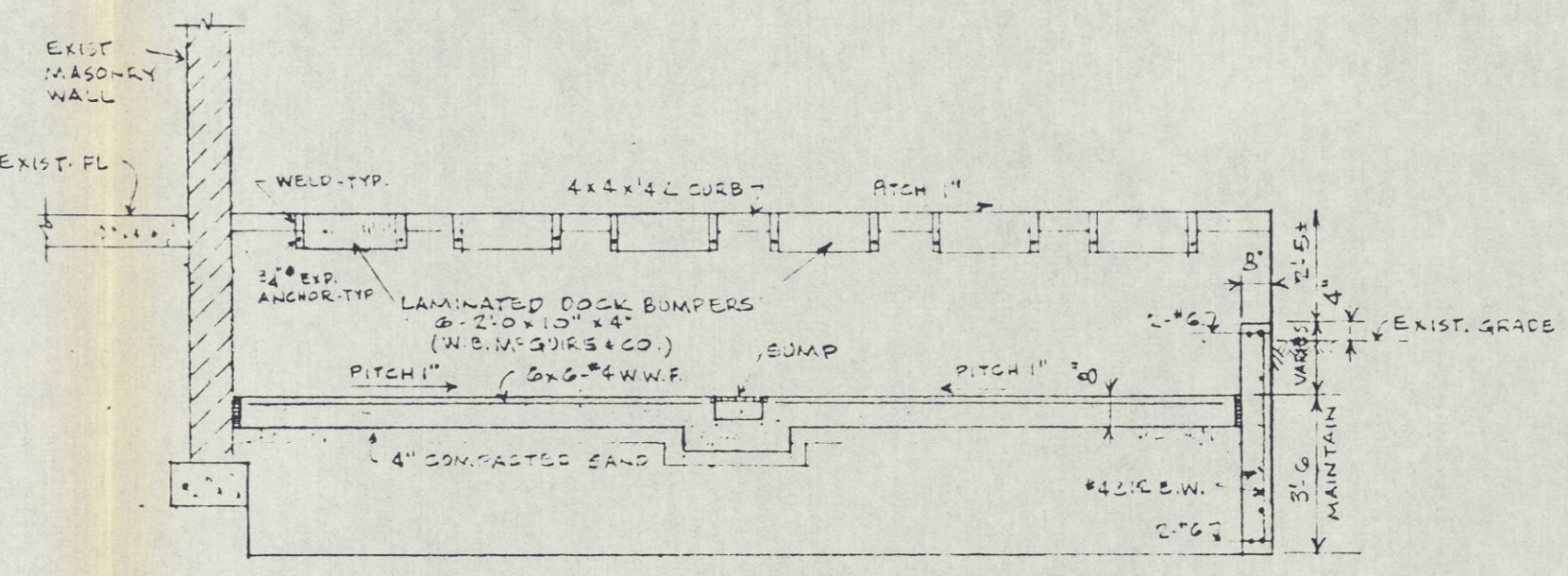
- 1) ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, BE AIR ENTRAINED AND HAVE A MINIMUM OF 3 BAGS OF CEMENT.
- 2) ALL REINFORCING STEEL SHALL BE NEW ERLUST STEEL DEFORMED BARS CONFORMING TO STANDARD SPECIFICATION ASTM A615, GRADE 60; REINFORCEMENTS ASTM A305.
- 3) LAP ADJACENT SHEETS OF WELDED WIRE FABRIC ONE SPACE + 2".
- 4) FOUNDATIONS, WALLS AND SLABS TO BE FOURED WITHOUT HORIZONTAL JOINTS.
- 5) ALL SAND BACKFILL TO BE THOROUGHLY COMPACTED TO 95% OF ITS STANDARD PROCTOR MAXIMUM DRY DENSITY.



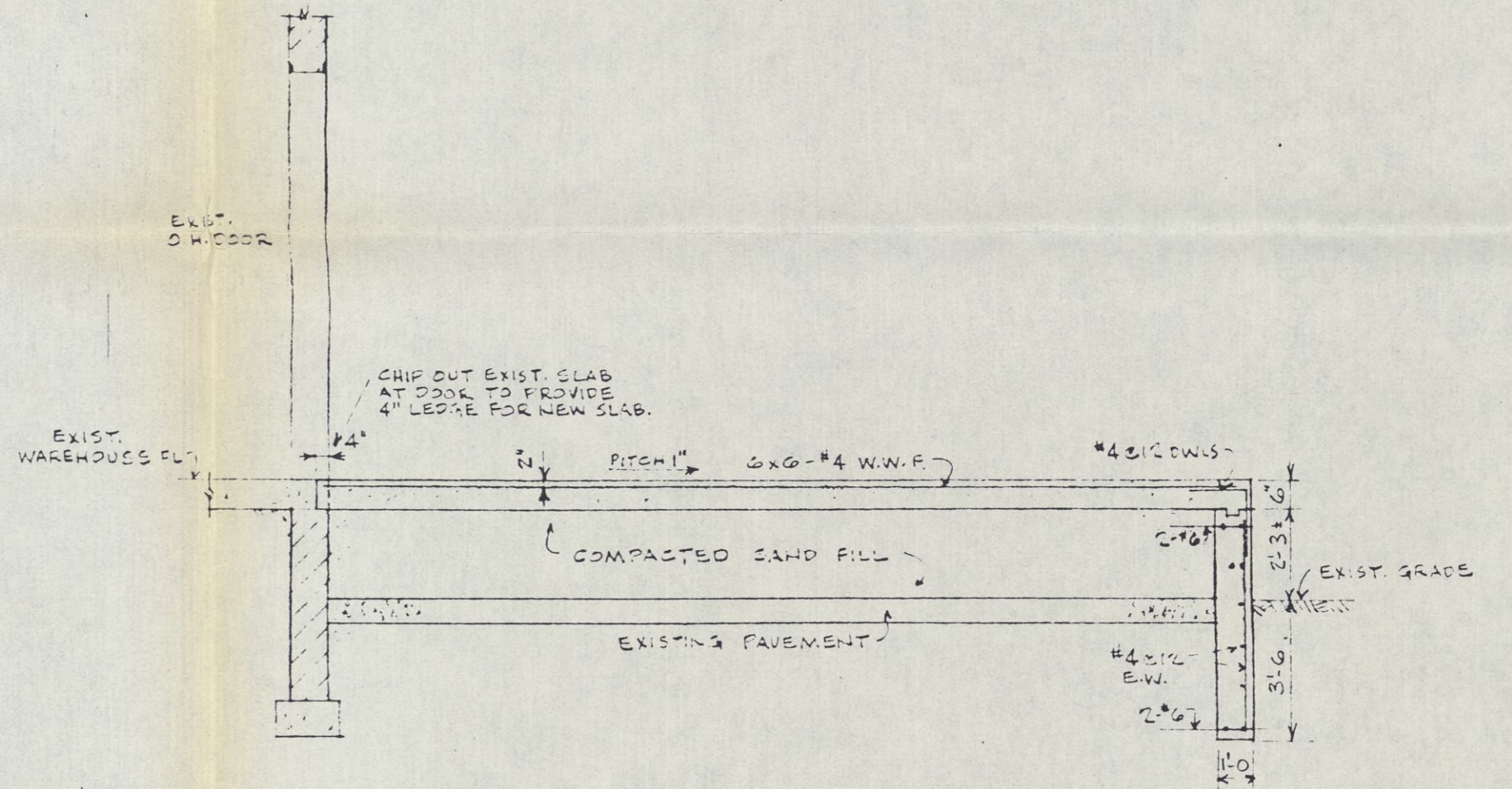
SECTION 1-1
SCALE: 1/4"=1'-0"



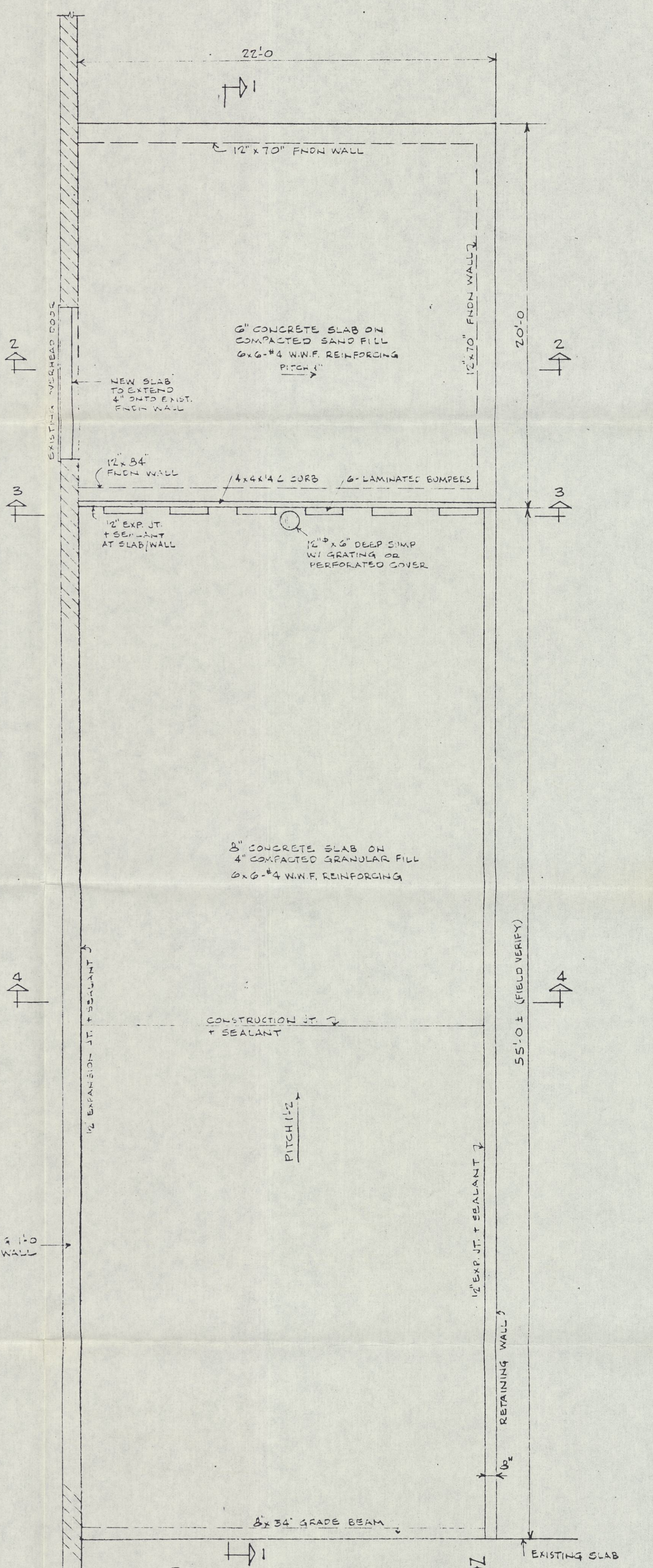
SECTION 4-4
SCALE: 1/4"=1'-0"



SECTION 3-3
SCALE: 1/4"=1'-0"



SECTION 2-2
SCALE: 1/4"=1'-0"



PLAN OF LOADING DOCK
SCALE: 1/4"=1'-0"

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Waste Management Division

FLAMMABLE LIQUIDS LOADING DOCK FOR GOLD SHIELD SOLVENTS DIVISION OF DETREX CORPORATION 12836 EATON AVE DETROIT, MICHIGAN 48226

1-20-88	BIDS	COMM. NO.	87-1092	ROBERT J. DAVIS, P.E. CONSULTING ENGINEER 2410 BOOK TOWER DETROIT, MICHIGAN 48226	1 OF 1
1-19-88	BUILDING PERMIT	DATE:	JAN. 19, 1988		
12-16-87	D.N.R. APPROVAL ONLY	ISSUED FOR			
DATE					

